THE HEATING AND VENTILATING MAGAZINE

Cooperstown, N. Y. FEBRUARY, 1917 1123 Broadway, New York

General Mechanical Equipment of the William Penn Hotel, Pittsburgh, Pa.

A Plant Designed to Meet Every Demand of the Modern Hostelry

One of the latest and most completely equipped hotels is the William Penn, recently erected in Pittsburgh, at Sixth Avenue and Oliver Street. The building is on a plot 216 by 129 ft. and has a height above the street of approximately 250 ft. Below the street level the basements extend to a depth of 55 ft. The cubical contents above the street are approximately 7,000,000 cu. ft.

The main floor of the building is devoted to dining rooms and hotel offices. On the main floor mezzanine there is located the writing room and the main kitchen, which kitchen serves both of the main floor dining rooms.

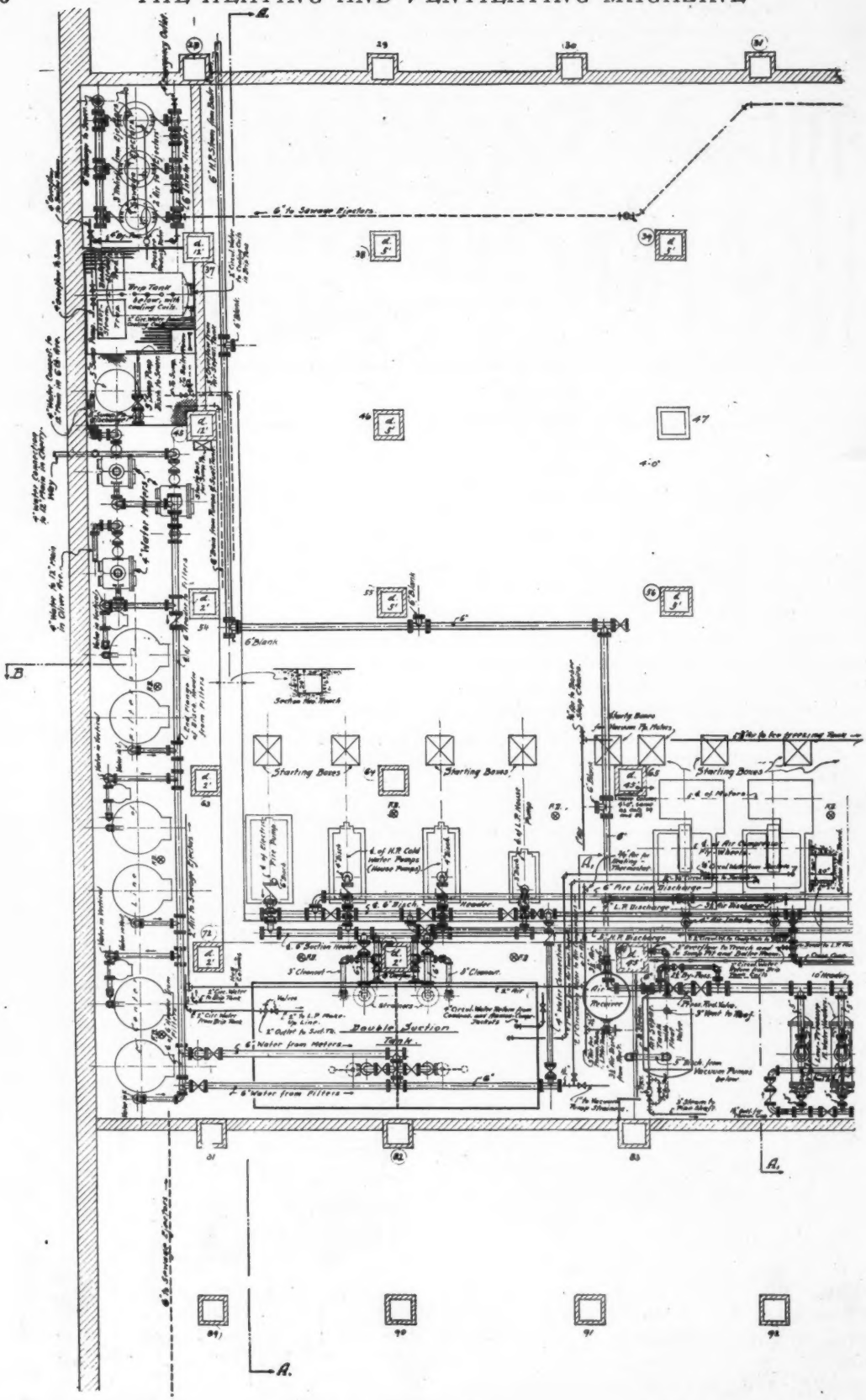
Above this level there are sixteen floors of bedrooms on one of which, the parlor floor, is located the state suite. The above-mentioned sixteen bedroom floors contain nearly 1,000 bedrooms, each being provided with a separate bathroom. Serving pantries for service to the bedrooms are located on every third bedroom floor.

The sixteenth and seventeenth floors are devoted to the main ball room, banquet and private dining rooms. There are two kitchens for the service of these rooms which are located on the same floors.

Above the seventeenth floor the building is devoted to hotel operative departments and the general mechanical equipment, such as fans, elevator machines, water tanks, brine and drinking water balancing tanks.

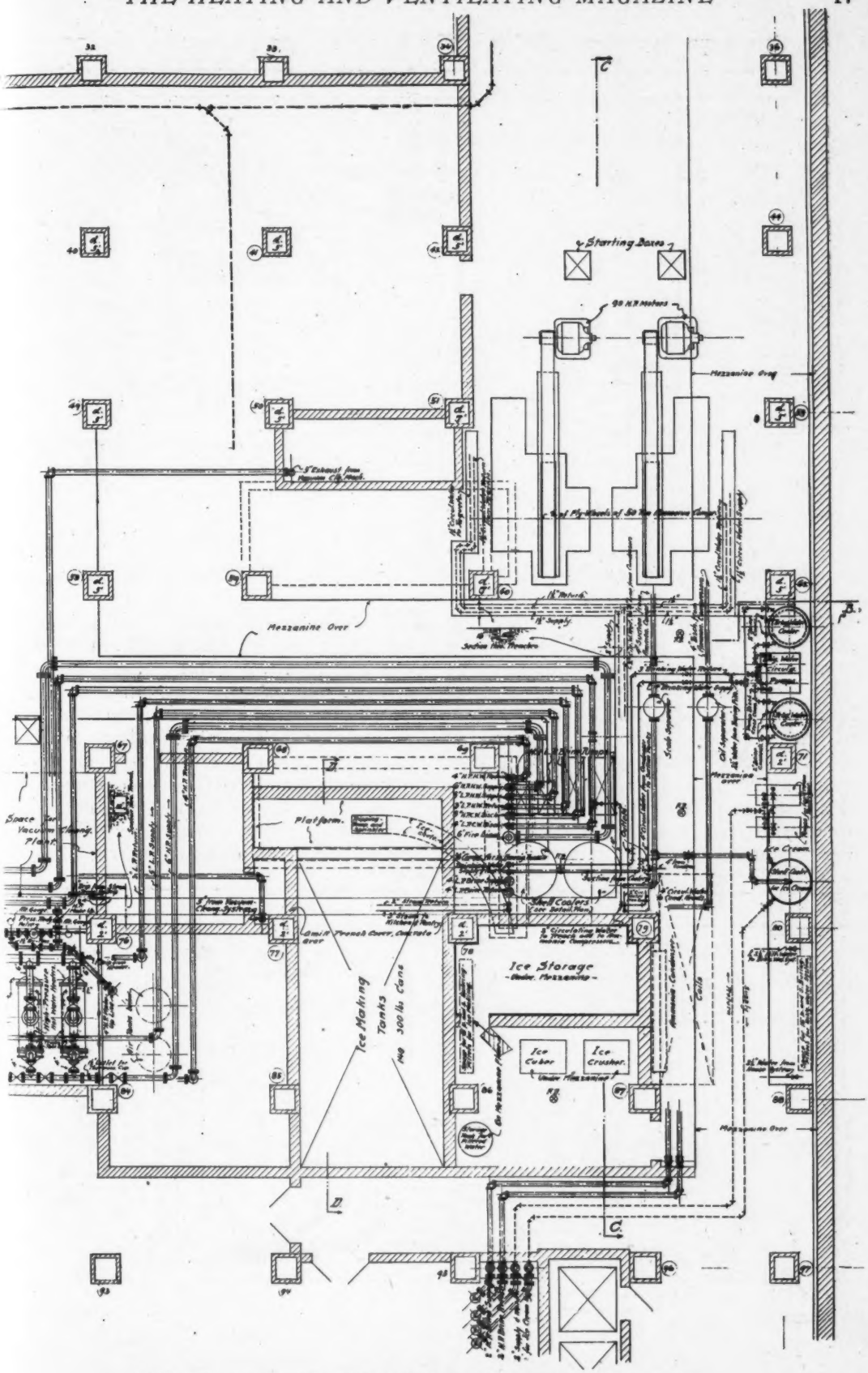
Below the street there are four levels, the first being the basement, containing the Elizabethan dining room, bar room,

WILLIAM PENN HOTEL, PITTSBURGH.

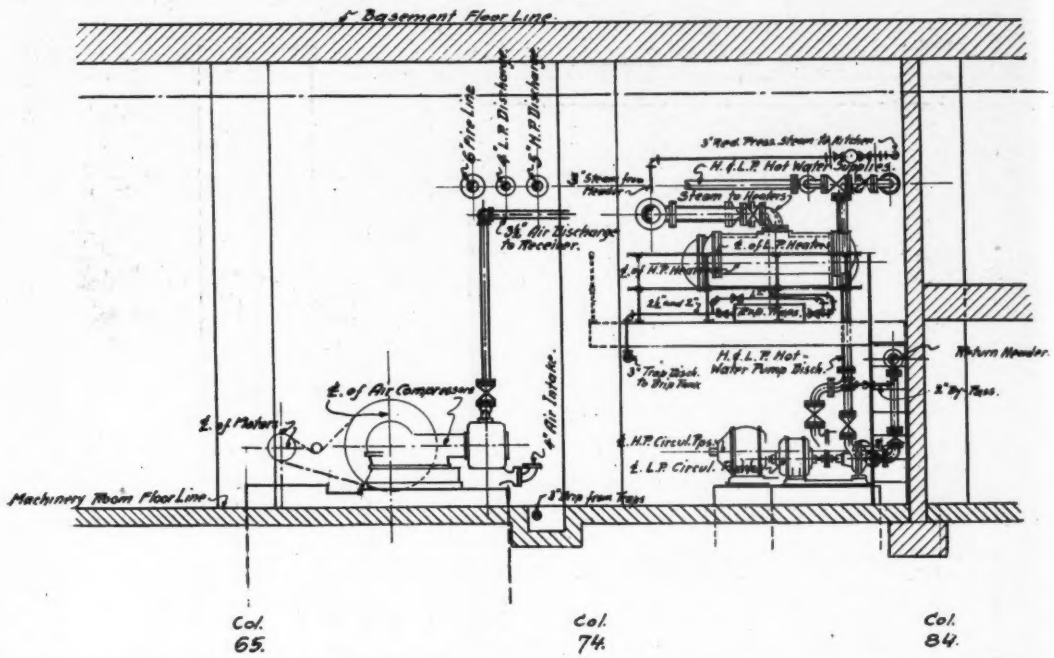


Plan of Machinery-Ra

PLAN OF MACHINERY ROOM, WEST SIDE, WILLIAM PENN HOTEL.



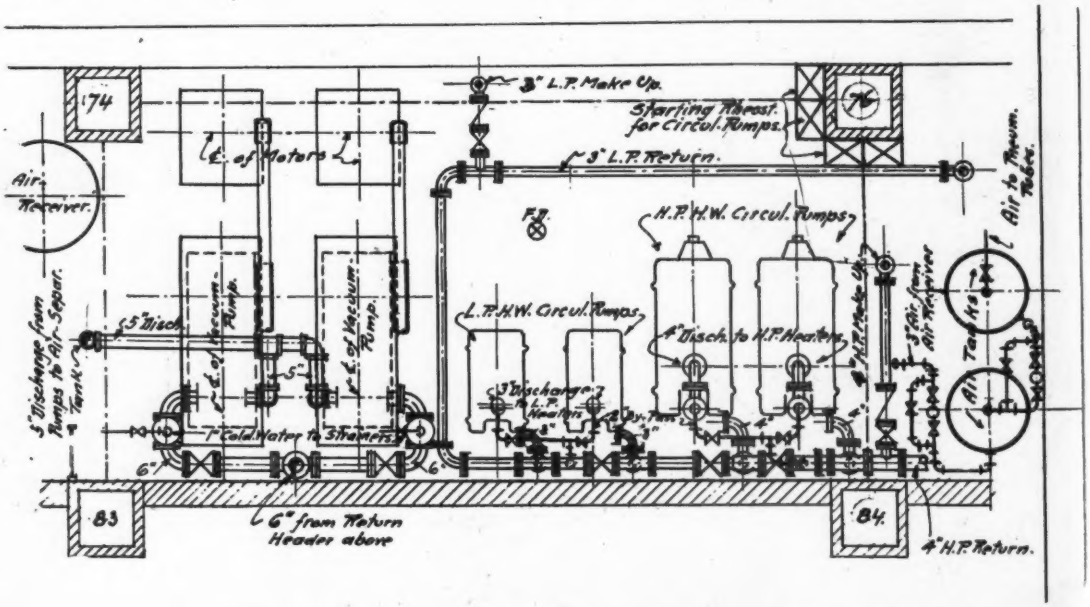
PLAN OF MACHINERY ROOM, EAST SIDE, WILLIAM PENN HOTEL.



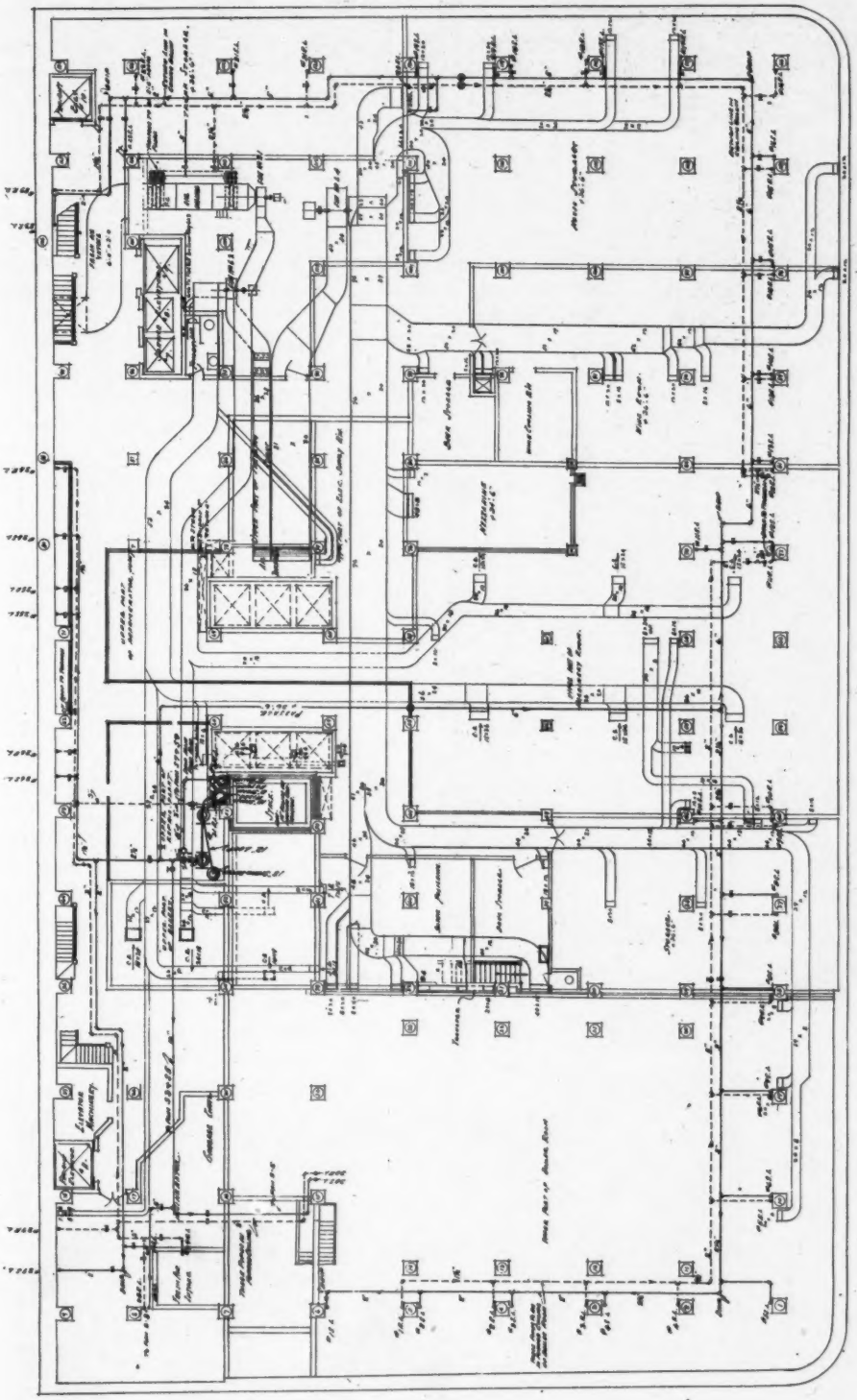
SECTION A-A, MACHINERY ROOM PLAN, SHOWING ARRANGEMENT OF HOT WATER HEATERS.

barber shop, grill kitchen, barber shop and general help quarters. The second level, the first sub-basement, contains wine and beer storage boxes, general hotel storage space and the upper part of the machinery room. The second sub-basement, contains the machinery room, upper part of boiler room and general storage space. The lowest level, about 60 ft. below the street, is the boiler room.

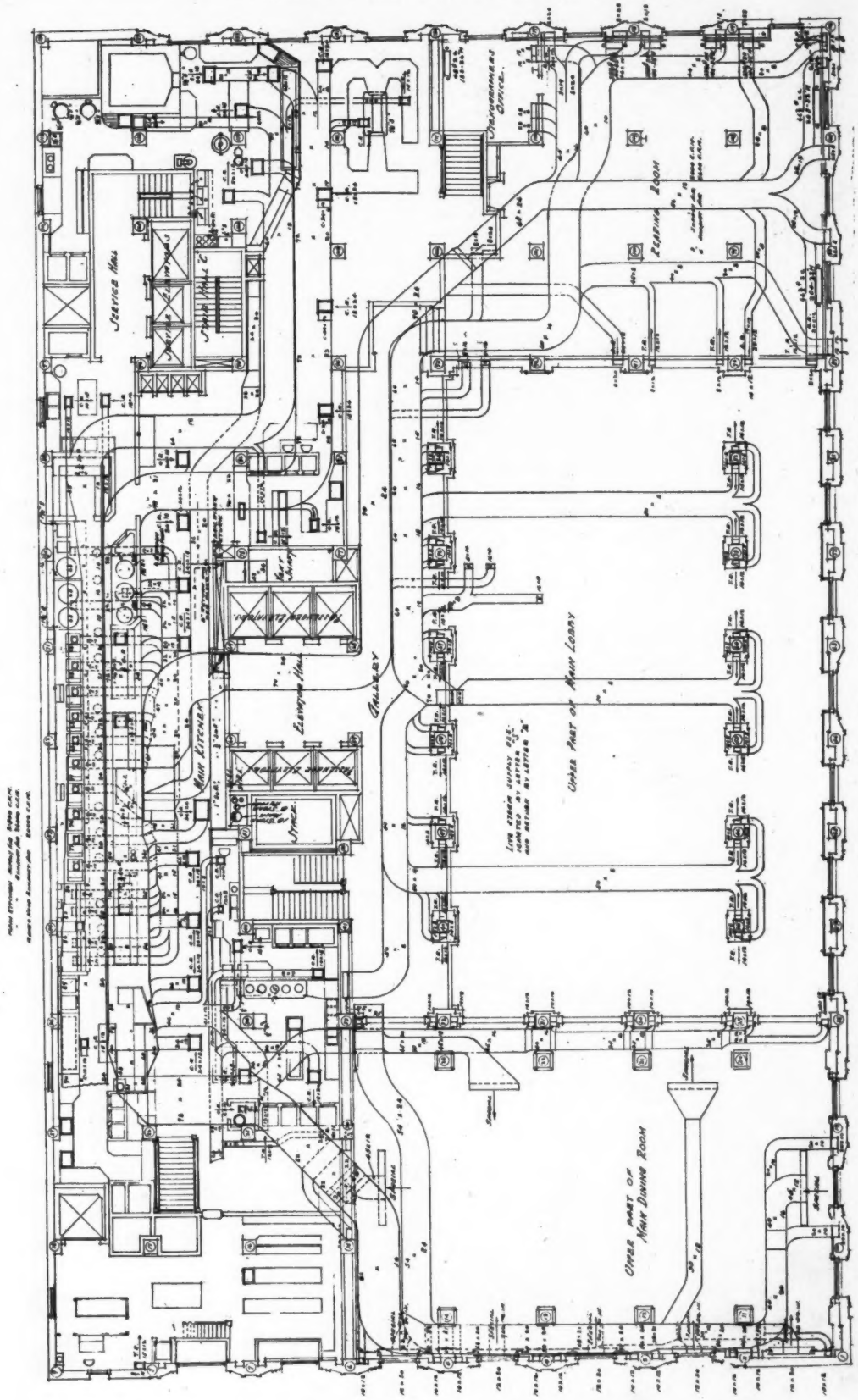
The mechanical plant of the building is unique in that all electrical power services are received from outside sources, and all mechanical equipment is electrically operated. The electrical current is supplied to the building by the Duquesne Light Company and the hotel company has leased to the Duquesne Light Company certain portions of the sub-basement in which they have installed steam generating boilers.



PUMPS, ETC. UNDER HEATER PLATFORM, MACHINERY ROOM.



FANS, DUCTS, ETC., IN FIRST SUB-BASEMENT, WILLIAM PENN HOTEL.



VENTILATION FOR MEZZANINE FLOOR AND MAIN KITCHEN, WILLIAM PENN HOTEL.

Low steam pressure is supplied for direct and indirect heating systems and medium pressure steam is supplied for the kitchen equipment. The electrical current for lighting is 220-110 volts A.C. and for power is 240-120 volts D.C.

In the machinery room, in the second sub-basement there are located the electrically-driven centrifugal pumps for the high and low pressure water systems, the suction tanks, the hot water generators for supplying hot water to bathrooms and kitchens, the vacuum return pumps and separators for the vacuum heating system, water filters, cold water and steam condensation meters, drip tanks and ejectors, electrical-driven air compressors, receivers and storage tanks, the vacuum cleaning plant, the ammonia compressors, brine and water coolers, condensers, ice-making tank, ice storage space, ice cubers and crushers, filters for drinking water and water supply to freezing tank and circulating pumps for the brine and drinking water systems.

HEATING AND VENTILATING SYSTEMS

The heating system is of the vacuum type with duplicate, motor-driven vacuum pumps. The heating system is divided into two separate systems, one which serves the lower portion of the building, known as the lower system, and the high system which serves that portion of the building above the lower pipe space.

The high system is of the down-feed type, with supply mains in the pipe space above the fifteenth floor at an elevation of 270 ft. From the machinery room there is carried an 18 in. supply main to this pipe space, at which level it is distributed through loops to the various risers. From these loops there are taken risers which feed the various radiators throughout the ball room, private dining rooms, reception rooms, bed and bath rooms. The return risers for the high system are collected in the lower pipe space at an elevation of 93 ft. and main return riser is run to vacuum pumps in the machinery room.

The low system is of the up-feed type with supply and return mains on the ceiling of the first sub-basement. This system is for all of the public rooms on the lower floors, such as dining rooms, grille, lobby and waiting room, together with the various service quarters. The above systems also serve the various indirect fan stacks throughout the building.

All radiators are of the smooth-section, cast-iron type, with nipples at bottom and top tie rods. Radiators are in general located under windows and are exposed in all cases, except in the main rooms. All radiators in exterior bath rooms are of the same type as those installed in the bedrooms while those in the interior bath rooms are of the wall type. Throughout the main rooms the radiators are enclosed in ornamental grills and are in general provided with thermostat control operated by multiple thermostats.

All steam and return piping throughout the building is covered with non-heat-conducting covering, same being recanvased where exposed in finished spaces. Expansion and contraction of piping is taken care of by swings and bends, the expansion loops being in the furred ceiling or pipe chases at exterior walls. The main supply riser is provided with a slip expansion joint. The piping is anchored at suitable points so that all expansion is away from the anchors towards expansion loops or swings. Sleeves have been provided around piping where same pass through walls or floors. Where pipe is exposed in finished rooms escutcheons are placed around same.

Thermostat control is installed on all tempering and reheating stacks of the supply fans, these also being of the multiple type. Adjacent to thermostats, located in ducts, there has been installed mercurial thermometers with perforated stem casing and flange for connection to sheet metal work.

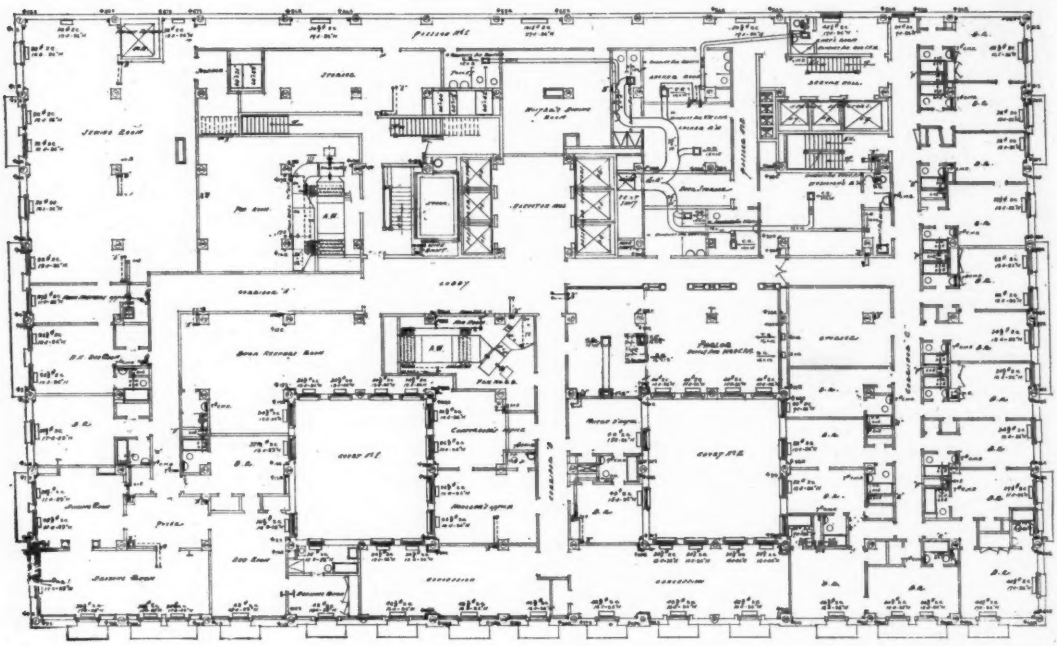
The vacuum valves are of the Haines manufacture and the duplicate vacuum return pumps are of the Nash Engineering Company's manufacture. This is the first building in which a pump of this type and manufacture has been used for vacuum heating purposes. These pumps are provided with the usual automatic vacuum control apparatus, gauge board, air separating tank and strainers.

From the air separating tank there is taken a connection from the bottom of the tank to the water pump and a connection from the top to the air exhausting pump, both pumps being mounted on the same shaft and on a common bedplate with the motor.

The ventilation system is very complete in that all main rooms, kitchens and the various spaces below the street level are supplied with fresh air and have vitiated air exhaust. The bathrooms have no supply, but are provided with exhaust. There are twenty-three Sturtevant motor-driven fans throughout the various floors, eight of which are supply and fifteen exhaust. All supply fans are provided with air washers and range in capacity from 36,000 cu. ft. to 7,000 cu. ft. per minute, with Westinghouse motors ranging from 22 H.P. to 4 H.P. All motors are of the 220 volts D.C. multipole type, shunt wound, with a speed variation of 100% to 50%. The range of exhaust fans is about the same as the supply fans.

Most of the large rooms have their individual supply and exhaust systems and there are individual systems for toilet exhaust, bath room exhaust and range hood exhaust.

The fans are located on various floors throughout the building, being as near as possible to the spaces which they serve. Great care has been taken in the installation of the ventilating system and in the selection of apparatus to eliminate any possibility of noise from the fans, motors or ducts and the telephoning of same throughout the building structure. The total capacity of all fans is very close to 500,000 cu. ft. of air per minute, with a total connected horsepower of approximately 275 H.P. All supply fans have tempering and re-heating stacks the total amount of which is almost 9,200 sq. ft.



LOCATION OF HEATING AND VENTILATING APPARATUS ON PARLOR FLOOR, WILLIAM PENN HOTEL.

The largest single group of fans is in the pent house where there are grouped two supply fans and ten exhaust fans.

The total direct radiation and equivalent indirect throughout the building is approximately 125,000 sq. ft. of surface.

The Duquesne Light Company has leased certain portions of the basements in which they have installed steam generating boilers, using gas for fuel. Steam service is supplied to the hotel company from these boilers at two pressures, a medium pressure for cooking purposes

and a low pressure for the heating system. The steam quantities are measured by means of condensation meters located in the basement, which meters discharge into open tanks located in the Duquesne Company's space. These meters measure separately the kitchen, plumbing and heating steam.

REFRIGERATION

There are two electric-driven ammonia compressors of the Triumph Company's manufacture, each having a rating of 50 tons of refrigeration, making a total of 100 tons.

The ice-making tank contains 140 300-lb. cans and the cooling of the brine in the tank is accomplished by direct expansion ammonia coils. The brine circulation throughout the tank is accomplished by motor-driven agitators. Throughout the building there are 57 boxes having a total cubical contents of 30,000 cu. ft., all being brine cooled by galvanized-iron pipe coils.

The brine circulation to the boxes is divided into three systems, one being designated as the high, one as the low and the other as the ice cream system. The low system cools all boxes in the main kitchens and below, the high system cools all boxes in the banquet kitchens and serving pantries.

These circulating systems are of the positive differential type; that is, the mains are looped and the pressure difference between boxes is kept constant. There are, however, several boxes that are shunted across the mains.

The pumps for the low system are of the centrifugal type, motor-driven. The

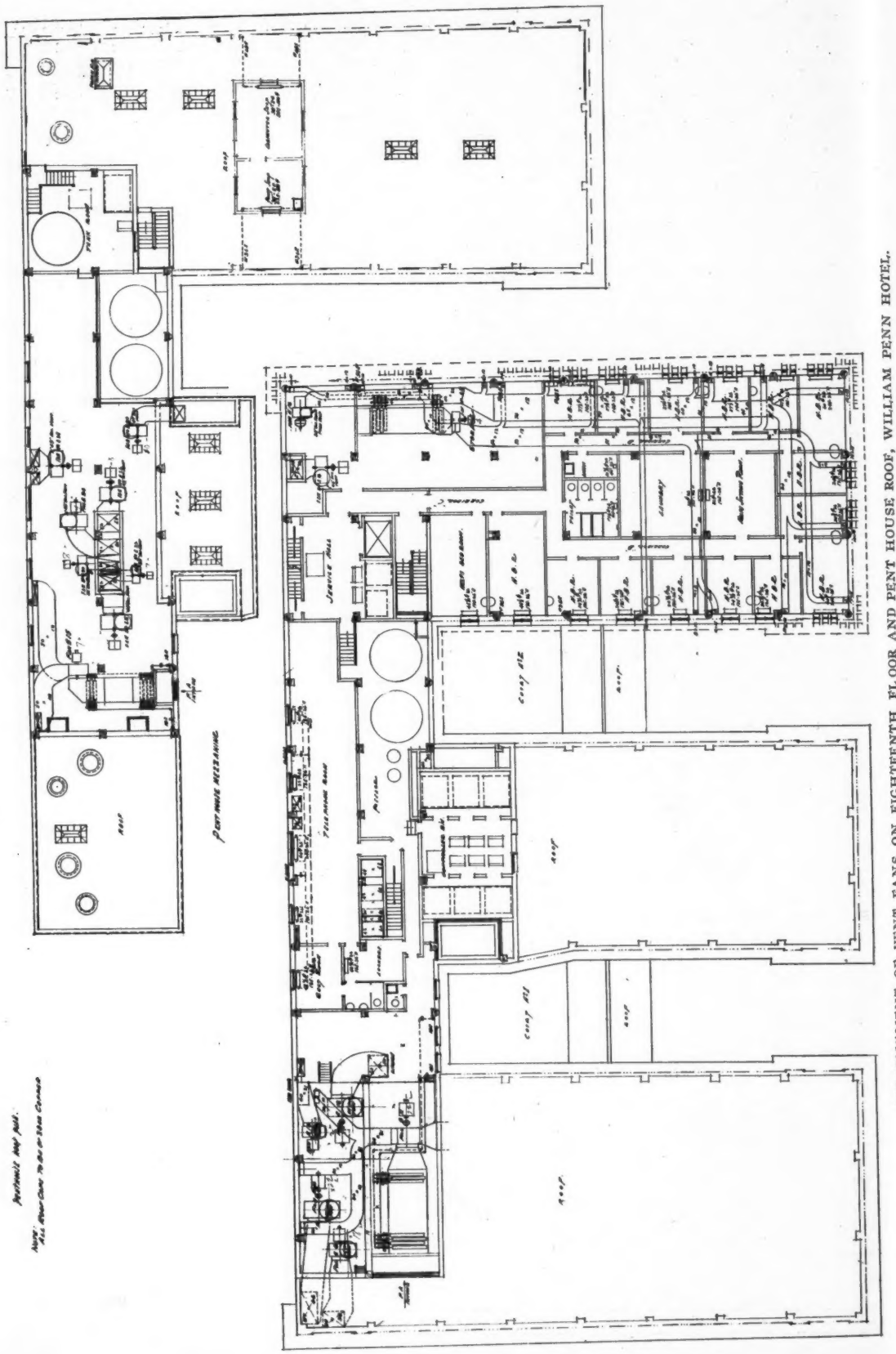
SCHEDULE OF FANS, SPEEDS, POWERS, CAPACITIES ETC.

EQUIVALENT FOR A. B. CO. RATING.

	Static Pressure	Fan No.	Capacity. C. F. M.	Motor No.	Speed	Air Washer Capacity.	Heaters	Surface	Location
					FIRST SUB BASEMENT				
S.B.S.1.	1"	S-1	7,500	4.	338-179	10000.	T.C. 4 Row 40"-2 Sec. H.C. 3 " 40" 3 "	270 ft 208.5	S.B.S.
S.B.E.1.	1½"	E-2.	10,000	7.	417-209	NONE	NONE		S.B.E.
B.S.1.	1½"	E-4	32,500	18.	280-140	" " "	" " "		B.E.
					BASEMENT				
B.S.1.	1½"	S-3	27,500	20.	243-122	30,000.	T.C. 4 Row-2 High 50"-13 Sec. H.C. 3 " " " " " "	960 ft 798 ft	B.S.
					MEZZANINE				
M.S.1.	1½"	S-5	25,000	16.	238-129	25,000.	T.C. 4 Row-2 High 40"-14 Sec. H.C. 3 " " " " "	690 ft 630 "	M.K.S.
					PARLOR FLOOR				
P.S.1.	1"	S-7	12,500	6.	250-125	15,000	T.C. 4 Row 50"-11 Sec. H.C. 3 " " " "	418 ft 313.5	P.D.R.S.
							T.C. Top-4 Row-40"-12 Sec. T.C. Bot. " " 50" -12 "	808 ft	
P.S.1.	1½"	S-9	25,000	16	219-109	25,000.	H.C. Top 3 Row-40"-12 Sec. H.C. Bot " " 50" 12 "	612 ft	M.F.S.
					18TH. FLOOR				
P.S.1.	1½"	E-6	22,000	18.	326-163	NONE	NONE		N.T.E.
P.S.1.	1"	E-8	36,000	22	219-110	" " "	" " "		Bl.R.E.
P.S.1.	1½"	E-10	17,500	15.	390-195	" " "	" " "		P.D.R.E.
P.S.1.	1½"	E-12	30,000	22.	244-122	" " "	" " "		M.K.E.
P.S.1.	1½"	E-14	22,000	18.	326-163	" " "	" " "		S.T.E.
P.S.1.	1"	E-16	8,500	5.	366-183	" " "	" " "		P.D.R.E.
P.S.1.	1"	S-11	36,000	22	219-110	40,000	T.C. 4-Row-2 High 40"-20 Sec. H.C. 3 " 2 " 40"-20 "	1200 ft 900 "	Bl.R.S.
P.S.1.	1"	S-13	7,000	4.	359-177	10,000	T.C. 4-Row-40"-9 Sec. H.C. 3 " 40" 9 "	270 ft 202.5	P.D.R.S.
					PENT HOUSE				
	1"	S-15	12,500	7	305-152		T.C. 4-Row-50"-11 Sec. H.C. 3 " 50"-11 "	418 ft 313.5	Bl.R.K.S.
P.S.1.	2"	E-18	22,000	18.	363-182	NONE	NONE		M.K.Ry.K.E.
S.S.1.	2"	E-20	10,300	8.	504-252	" " "	" " "		B.R.Ry.K.E.
P.S.1.	2"	E-22	6,650	7.	628-314	" " "	" " "		T.P.L.K.Ry.K.E.
P.S.1.	1½"	E-24	15,000	9.	282-141	" " "	" " "		M.P.E.
P.S.1.	1½"	E-26	22,000	18.	326-163	" " "	" " "		C.T.E.
P.S.1.	1"	E-28	16,500	9.	260-130	" " "	" " "		Bl.R.K.E.
G.S.1.	1½"	E-30	13500	10.	363-183	" " "	" " "		Gnl.T.E.

■ PIN HOLE TEST.

ALL VENTS TO BE NARROW SECTIONS 5⅜" ON CENTERS.



ARRANGEMENT OF VENT FANS ON EIGHTEENTH FLOOR AND PENT HOUSE ROOF, WILLIAM PENN HOTEL.

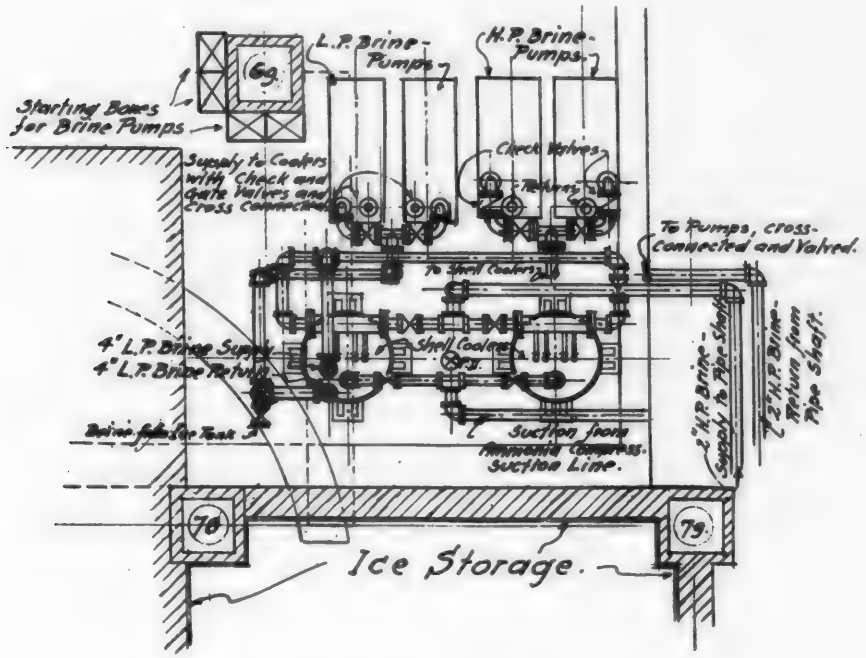
supply main rises from the pumps to the ceiling of the machinery room and is run thereon to a pipe shaft adjacent to the service elevators. At the main floor is located a florist box which is connected directly across the mains. There are no more boxes taken off the supply main, but same discharges into an open balancing tank set on the parlor floor. From this balancing tank the supply main drops to the ceiling of the main kitchen and is looped thereon. The return riser is run parallel to the supply and is looped in the opposite direction. The supply and return branches are taken from these mains through valves to the box coils. After circulating about the main kitchen ceiling, the mains drop in the pipe shaft to the grill room kitchen, the supply main stopping at the last box and the return main returning direct to the brine coolers in the basement. In parallel with the above loops there is also another loop taken from the same balancing tank, which supplies brine to coils in the butcher shop boxes.

The operation of the high system is similar to that of the low in that the mains are looped around in the ceiling of the kitchen, but across the vertical risers there are several pantry boxes shunted.

The balancing tank for the high system is located on the eighteenth floor. The high and the low systems are operated through a common, duplicate set of brine coolers, although each system has an individual duplicate set of circulating pumps.

The ice cream freezers and storage boxes are cooled by a separate and individual system having a separate shell cooler and duplicate circulating pumps. The brine is circulated throughout the building to the various ice cream freezers and hardening boxes.

Every bathroom throughout the building is supplied with drinking water. The makeup water is filtered through a bank of Buhring filters and is connected into the circulating line at the drinking water coolers, the circulating return and makeup water passing through these coolers, wherein it is cooled by direct-expansion coils. The drinking water system is of the overhead down-feed type, circulated



PLAN OF SHELL COOLERS AND BRINE CIRCULATING PUMPS.

by duplicate, motor-driven centrifugal pumps. The discharge from these pumps is carried up in the pipe shaft to the eighteenth floor level where is located the balancing tank. The supply main is carried therefrom to the loop located in the furred ceiling of the fifteenth floor. From the high level loop risers are taken down through each bath room shaft and branches therefrom run to drinking water faucets on each lavatory. In the pipe space of the mezzanine floor the circulating return mains are looped, to which loops the circulating lines from all risers above are connected. The returns are carried down through the building to the circulating pumps.

ELEVATORS AND DUMBWAITERS.

The elevator and dumbwaiter equipment consists of six passenger cars, four service cars, one freight car and seven dumbwaiters of Otis make. Two of the service cars have geared machines of the drum type located in the basement. The remainder of the service cars, together with the freight and passenger cars, have overhead machines of the one-to-one traction type. These machines are located in elevator pent houses over the hatchways and are so arranged that there is no perceptible noise in the elevator shafts due to their operation. The pent houses are separated from the elevator shaft by solid concrete slabs.

The elevator cars and machines are of the most modern type and are completely equipped with safety devices. All elevator cars are provided with emergency exits and when two or more cars are located adjacent to each other in the same hatchway, it is possible to pass from one car to the other through these emergency exits.

The dumbwaiter machines are also located over the car shafts and are of the geared, drum type. All dumbwaiters are of the full automatic type, and those for pantry service have their main control point at the main kitchen level. These cars can only be despatched from this level and when arriving at their destination they automatically open the dumbwaiter shaft door. Simultaneously with the opening of the door a buzzer is brought into operation, thus calling the attendants' attention to the car. After removing the contents of the dumbwaiter the attendant closes the shaftway door and the car automatically returns to the main kitchen level. Aside from the initial pressing of the sending button and the closing of the doors by attendants, the operation is automatic. The sending board is also provided with a return button which will stop the car and return it to the sending point if the button is pressed before the car reaches its destination. The object of this is to return the car if the attendant sees that he has made a mistake in the sending.

WATER SYSTEMS.

The house service cold water pumps are of the Alberger centrifugal type, automatically operated by electric tank switches. The cold water system is divided into two sections, the low system which supplies all water to the lower portions of the building through tanks located on the parlor floor, and the high system which supplies water to the bedroom floors and spaces above same through the roof tanks. Adjacent to the house service cold water pumps there is located the fire pump which delivers water to the fire tank in pent house at the roof and from which tank is taken the mains to the various standpipe risers throughout the building. This pump is also automatically controlled by electrical tank switches.

COMPRESSED AIR SYSTEM.

The compressed air for operating the pneumatic tubes, ejectors, heating control and lifts is supplied by duplicate electric-driven automatic Clayton air compressors, each of 350 cu. ft. per minute displacement against 25 lbs. per square inch pressure.

These machines start and stop with a slight variation of air pressure in the storage tank. From this tank the air is distributed to various points of usage about the hotel.

The entire mechanical equipment was designed and supervised by Clyde R. Place, New York, consulting engineer for the architects, Janssen & Abbott. The heating and ventilating systems were installed by F. E. Geisler, sub-contractor of the general contractors, the George A. Fuller Company, New York.

Relative Economy of Heating by Steam at Different Pressures.

By A. BEMENT

Recently in Chicago there has been occasion to examine the matter of cost of heating with steam at atmospheric pressure, as against 3 to 5 lbs. pressure, in modern office building plants. It is felt that your readers may be interested in the results of a study of the subject.

When the question was presented, the opinion of a number of engineers was sought, four of whom said that there was no difference in the amount of heat required and consequently no difference in cost. Two said that the difference was so small that it could not be detected by the most elaborate test, as the necessary error of observation is larger than any possible difference. Another gave as his opinion that there was a very large difference.

In an analysis of the problem, a heating requirement of 5,000 B.T.U. per hour was taken, a pressure of 5.3 lbs. being used to compare with atmosphere, as the figures applying to the characteristics of steam in Kent's Pocket Book are given for these pressures and may be verified accordingly. The following table gives the data.

In operation steam enters the radiator and gives up its latent heat (item 2 of the table). It is this heat that does the work of warming. The condensation, which is at the same temperature as the steam when it entered, as per items 4 and 5, returns to the boiler, carrying all of the original heat of the steam not used for warming. Thus the heat returning to the boiler is again

Item	*Pressures* *Atmosphere*	5.3 *Lbs.*
1. B.T.U. in the water below boiling point, in one pound of steam	180.0	196.1
2. Latent heat in one pound of steam, in B.T.U.	970.4	960.1
3. Total heat in one pound of steam in B.T.U.	1150.4	1156.2
4. Temperature of the steam, deg. F.	212.0	228.0
5. Temperature of the water of condensation, deg. F.	212.0	228.0
6. Volume in cubic feet of 1 lb. of steam	26.79	20.08
7. Heating requirement, in B.T.U. per hour	5,000	5,000
8. Pounds of steam required per hour (heating requirement divided by the latent heat of one pound of steam)	5.152	5.207
9. Total B.T.U. per cubic foot (B.T.U. per pound divided by cubic feet)	42.98	57.98
10. B.T.U. available for heating per cubic foot of steam (latent heat divided by cubic feet in one pound	36.9	47.8
11. Cubic feet of steam required to furnish the heating requirement of 5,000 B.T.U. per hour (5,000 divided by item 10)	135.5	104.6
12. Relative volume of piping and radiators required with same velocity in movement of steam, assuming 5.3 lbs. pressure as unity	1.29	1.00
13. B.T.U. delivered per hour from each square foot of radiating surface, with air temperature at 70° F.	234	260
14. Square feet of radiating surface required (heating requirement of 5,000 B.T.U. divided by B.T.U. delivered per square foot of radiating surface per hour	21.36	19.23
15. Time in minutes required to deliver 5,000 B.T.U. from 21.36 sq. ft. of radiating surface	60	54

circulated without loss. The following heat balance shows that the low pressure steam gives up about 1% more heat than the 5.3 lb. pressure:

This shows that at atmosphere we must carry around the cycle from boiler back again to boiler 8.03% of the total steam at atmosphere more than at 5.3 lbs.

HEAT BALANCE IN B.T.U. PER POUND.

	Pressures *Atmosphere*	5.3 *Lbs.*
B.T.U. used in heating	970.4	960.1
B.T.U. recovered in the water of condensation and returned to the boiler for re-use without loss	180.0	196.1
Total B.T.U. accounted for	1150.4	1156.2
B.T.U. supplied in the steam (item 3)	1150.4	1156.2

HEAT BALANCE IN PER CENT.

B.T.U. employed in warming	84.35	83.04
B.T.U. returned to the boiler for re-use	15.65	16.96
Total heat accounted for, B.T.U.	100.00	100.00

This, however, does not mean that there is such a difference in economy because this lesser amount of heat given up by the pressure condition, returns to the boiler for re-use, and the disadvantage is that 1% of the heat in a pound is carried around the cycle without doing work. This view, however, is based on the consideration of steam from the standpoint of its weight, but steam is a gas and gases are generally dealt with in volumes. If, then, the matter is considered in this light the following comparison presents a different view:

pressure; or, in other words, we must use a larger volume of steam at atmosphere by 8.03% to do the same work than if circulated at 5.3 lbs. pressure. The volume of steam as the pressure is lower increases much more rapidly than does the latent heat as shown by the table on next page.

This shows that to operate at 5 lbs. below atmesphere would require risers and piping of almost twice the capacity of those needed for 5 lbs. above atmosphere; more radiating surface would also be needed.

COMPARISON ON B.T.U. IN A CUBIC FOOT BASIS.

	Pressures *Atmosphere*	5.3 *Lbs.*
B.T.U. per cubic foot expended in heating (item 9, multiplied by first item of the heat balance, in per cent).	32.24	48.15
B.T.U. per cubic foot not used in heating but which is returned to the boiler for re-use (difference between items 9 and item above)	10.74	9.83
Total B.T.U.	42.98	57.98

COMPARISON IN PER CENT, BASED ON HEAT IN A CUBIC FOOT.

Used in warming, B.T.U.	75.01	83.04
Returned to the boiler for re-use, B.T.U.	24.99	16.96
Total B.T.U.	100.00	100.00

	Per Pound of Steam		
	Latent Heat B.T.U.	*Total Heat B.T.U.*	*Cubic Feet*
10.3 Lbs. above atmosphere	952.0	1160.4	16.30
5.3 " " "	960.0	1156.2	20.08
0.0 " " "	970.4	1150.4	26.79
5.0 " below "	982.0	1143.1	38.38
10.0 " " "	1000.3	1130.5	73.33
15.0 " " "	1073.4	1073.4	3294.00

When the matter is summed up, it appears that on the basis of heat in a *pound* of steam the atmosphere pressure has a theoretical advantage in higher latent heat of about one and a third per cent over 5.3 lbs. pressure. This, however, is off-set by the fact that all heat not used is returned for re-use, and there is no disadvantage in this because in each case there is a pound of condensation returned, being simply a little hotter in one case than in the other, so it requires just that much less heat to bring it to steam again.

According to this, there is no difference whatever in cost of heating at different pressures. There is, however, an advantage in the higher pressure from the standpoint of first cost of the plant, because as the pressure is greater, the plant may be smaller. This is a factor which in practice has a limited value, however, unless excessive pressures are used.

Any plant designed to work at 5 lbs. should have margin enough to work perfectly at atmosphere, and any plant designed to work at atmosphere will operate at 5 lbs. with ease and the cost of heating will be identical in each case.

Standard Data Sheets on Heating and Ventilation.

As announced last month, there is presented in this issue the first of a series of data sheets which it is proposed to develop eventually into a standard heating engineers' data book.

It is the present plan to include with each issue three or four standard-size data sheets containing practical information for the designer. The complete series will run into several hundred sheets and will aim to provide all the required designing information for the laying out of any system. After the sheets have been presented in THE HEATING AND VENTILATING MAGAZINE they will be reprinted separately, so that any missing or worn-out sheets may be obtained at the nominal charge of five cents each.

It will be noticed that the data sheets are arranged with a binding strip on the left hand end, so that they may be readily incorporated in a loose-leaf binder. They also have a cutting line so that, if desired, the binding strip may be trimmed off and a sheet 8-in. by 5-in. produced, which is a standard size for card index filing in a drawer or card tray with guides.

By preserving these sheets our readers may expect to have, in a short time, a really first-class condensed encyclopedia to which reference can be made quickly for all necessary information on the art of heating and ventilation. To this end every reader is asked to constitute himself a judge and critic and to scan carefully the data presented, notifying the publishers at once of any errors or discrepancies discovered. These will be submitted at once to expert opinion and, where necessary, new sheets published to take the place of those found incorrect.

Finally, arrangements have been made for supplying readers of THE HEATING AND VENTILATING MAGAZINE with suitable binders to contain the data sheets exclusively. Further announcement regarding these binders will be made next month. They will be made up with special reference to their appearance and durability, bound in duck, and stamped in gold. These binders will be supplied at $1.00 each. They will be ready March 1, but orders may be sent in previous to that time and will receive careful attention.

THE HEATING AND VENTILATING MAGAZINE

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IT IS with great satisfaction that we record a widespread and unqualified approval of our plan, announced last month, for the development of standard heating data, through the publication of the most approved tables and practice that we are able to obtain. The first series of these sheets appears on another page of this issue and, in passing, our readers are reminded once more (1) that the data are not in any sense final, but are open to modification after, but only after, we are in possession of more approved data; (2) that the whole success of the plan depends largely on the active and serious co-operation of every heating engineer through careful scrutiny of the data presented and notification of errors or improper statements. It is not expected for a moment that the information as presented will be at once accepted as standard. No doubt there will be many varying opinions as to its accuracy. It is almost impossible to get engineers to agree about such matters and that, by the way, is the reason why heating standards have not been developed long ago. But we do expect that the data will be accepted as equal to anything else extant and, by modifying the sheets where necessary, it will be possible to secure a serviceable and standard code.

The vital interest in this matter on the part of the engineering associations is well expressed in a recent letter received from the president of the National District Heating Association. He writes: "I read your editorial (regarding the publication of standard heating data) with a great deal of interest and want to express my hope that you will be able to get something definite along the line of heat loss co-efficients. If there is anything this Association can do to assist you in developing this standard, we would be very glad to co-operate. Please feel free to call upon the officers for any assistance you deem advisable."

Such a spirit, we believe, insures tangible results and we may say at this time that the plans for publication of heating data sheets have already expanded to the point of including important central station heating information such as rates, appraisal of heating property, costs and depreciation, as well as strictly engineering matter. The same thing applies to the schedule of heating data for it is the intention to have the sheets comprise as complete a handbook as possible.

IN COMPANY with the majority of publishers throughout the country we are obliged to ask the indulgence of our readers in connection with the paper stock used in THE HEATING AND VENTILATING MAGAZINE. As is well known, publishers are finding it quite impossible at the present time to obtain the desired quality, even at a higher cost. It is hoped, however, that this condition is only temporary.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS

Twenty-third Annual Meeting, New York, January 16-18, 1917

Almost every meeting of The American Society of Heating and Ventilating Engineers brings out some development in engineering work that has not previously attracted general attention. This year it was the possibilities of industrial drying, including the use of gas heaters for this purpose. Fred R. Still, of Detroit, sounded the keynote when he told of the tremendous possibilities in this direction, both in the United States and abroad. In the matter of drying hides, for instance, it is only recently that the time-honored practice of stretching them in lofts, exposed only to the action of the weather, has given place to mechanical drying methods, effecting savings of thousands of dollars in time and trouble. This, Mr. Still showed, was equally true of an endless variety of products, such as paper, cardboard, paints, oils, pigments, chalk, varnishes, clay and wood products.

J. IRVINE LYLE,
President, American Society of Heating and Ventilating Engineers.

Another feature of the meeting was the revival of the project to establish a code for testing house heating boilers. Although little progress was made at the meeting, it begins to look as if the movement has gained sufficient headway to bring the development of such a code among the probabilities of the near future.

The society met at the Engineering Societies Building, 29 West 39th Street, New York, January 16-18, 1917. It was not the largest turnout of the society's meetings, but the attendance was good and the discussions were full and sometimes lively. A total of 143 members, 56 guests and 25 ladies was registered.

Due to a combination of circumstances, the society had the good fortune to secure the large assembly room of the Engineering Societies Building for its meeting.

The opening session was called to order by President Harry M. Hart. He announced that F. K. Davis, J. E. Deegan and W. M. Van Inwagen would serve as tellers for the election of officers. He then presented his annual address.

PRESIDENT'S ADDRESS.

Mr. Hart said that the great need of the society is for closer co-operation and for progress in the field of standardization. He said we are facing abnormal conditions in the industrial world, and one important effect on the heating trade has been the rapid growth in the development of heating and ventilating designs applicable to manufacturing processes. The reticence on the part of engineers to discuss their methods has been a drawback and it is becoming more necessary than ever for a close and unrestrained co-operation.

We need standard practice for heating installations in apartments and residences and such standards have already been adopted by the Chicago Master Steam Fitters' Association. Not over 10% of such buildings, said Mr. Hart, can be heated to 70° when it is 10° below zero outside. He also stated that the pipe sizes proposed by a committee of the society in 1908 had been adopted by the Chicago master steam fitters for use in their work.

President Hart made the interesting announcement that the Chicago Commission on Ventilation has recently secured an appropriation from the city for furthering its work and this will enable the commission to make some important investigations in addition to those already undertaken. Three members of the society, he said, are now members of this commission.

This was followed by the report of the Council. This report gave the principal credit for the growth of the society to the Chapters and placed special emphasis on the work in this direction of the Michigan and New York Chapters. The council reported that the Bureau of Mines had invited the society to hold its next midsummer meeting in Pittsburgh in September at which time the dedication of the Bureau's new testing plant will take place. The council had, however, practically decided on Chicago as the next meeting place, but has arranged to be represented at the dedication ceremonies in Pittsburgh.

The agitation for compulsory ventilation laws in a number of western States was reported by the council, although no additions had actually been made to the existing laws on this subject.

Reference was made to the matter of Chapter representation in the council and this came up for further discussion later in the form of a proposed amendment to the constitution providing for such representation. No action, however, was taken in this matter.

Additional quarters, it was stated, had been secured in the Engineering Societies Building for storage purposes of society records, giving more room in the headquarters office.

Finally the council reported a new design for the society emblem which would shortly be ready for adoption.

Secretary C. W. Obert presented his annual report. He said the present membership totaled nearly 750. Some idea of the increase in the duties of the secretary's office was given in his statement of the division of the work. He showed, for instance, that the names of prospective members were being regularly listed and efforts made to bring the advantages of membership to their attention.

He stated that an index of the twenty-one volumes of the Transactions was being prepared for 10-year periods and would be issued early in the year.

The financial status of the society was reported to be the best in its history. The total receipts for the year, together with last year's balance, were $12,141 and the total expenses, $8,136, leaving a balance on hand of $4,004. The net assets were given as $13,526. The total membership at the beginning of the year was 626 and the accessions for the year, 125, making a total of 751. There was a loss of eight members during the year leaving a net membership of 739.

Under committee reports, a recommendation was made by the Committee on Local Secretaries that a local secretary be appointed in each locality where there is at present no society chapter. The functions of these officials will be to keep track of pending legislation on heating and ventilating matters, to secure news and other items for the society's Journal, to look up the qualifications of

ANNUAL DINNER OF THE AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, HOTEL ASTOR, NEW YORK, JANUARY 17, 1917.

prospective members, and to carry out any particular directions of the council. This matter was referred to the council, with a recommendation for favorable action.

For the Committee on Radiator Tests Prof. John R. Allen stated that a series of tests was now under way and that the committee expected to make a definite report at the next semi-annual meeting.

CHAPTER REPRESENTATION IN COUNCIL PROPOSED.

Under new business an amendment was proposed by J. D. Cassell, John R. Allen, W. F. Goodnow and Frank E. Phegley, giving each chapter the privilege of naming one of its members as a member of the society's council. As there are now six chapters, this would enlarge the council by that number.

Mr. Donnelly brought up the point that there would be legal difficulties in the way of carrying out this suggestion, as the society is an incorporated body.

It was then suggested that a chapter could nominate a member of the council and the membership could elect him.

Prof. William Kent said that the Institute of Mining Engineers had district representation on its council and that he thought the proposed amendment should be redrawn to meet the provisions of the law.

It was then suggested that if the chapter representatives had no vote it would solve the difficulty.

The matter was referred back to the proposers to be redrawn to meet the legal requirements. Pending any change in the constitution it was voted that a copy of the call and the minutes of each council meeting be sent to the various chapter presidents.

KANSAS CITY CHAPTER.

A petition was then presented from Kansas City members asking for the granting of permission to form a Kansas City Chapter. The petition was signed by Herbert H. Whitten, Prof. J. D. Hoffman, F. A. De Boos, Benjamin Natkin and a number of others. Although the council had approved the formation of this chapter it was left to the meeting to take definite action. After Mr. Natkin had explained the steps that led up to the formation of the chapter, the necessary permission was granted by unanimous vote.

NEW OFFICERS.

The report of the tellers was received showing the election of the following officers:

President, J. Irvine Lyle, New York; first vice-president, Arthur K. Ohmes, New York; second vice-president, Fred R. Still, Detroit, Mich.; treasurer, Homer Addams, New York; members of the council, Davis S. Boyden, Boston, Mass.; Bert C. Davis, Elmira, N. Y.; M. W. Franklin, East Orange, N. J.; Charles A. Fuller, New York; Harry M. Hart, Chicago, Ill.; E. Vernon Hill, Chicago, Ill.; James M. Stannard, Chicago, Ill.; Walter S. Timmis, New York.

The election of officers brought the business session to a close and the first paper on the professional programme was then presented. This was entitled "Railway Passenger Car Heating," by E. W. Rietz.

Railway Passenger Car Heating.

Mr. Rietz's paper was devoted largely to a description and discussion of the vapor system of car heating which, he said, is used on a majority of the railroads of the country and by the Pullman Company. The first method of heating railway trains was by the use of ordinary wood-burning stoves. These gave way to the hot water heater, known as the Pullman or Baker heater. With this system the heater or stove was placed in the end of the car in a small compartment. The water circulation was usually taken care of by placing four 1¼-in. pipes on each side of the car. The objections were that it took an hour to get up a good fire and a good circulation in the car and an equally long time to cool off. Next came what the speaker called the "straight pressure" system, in which the steam was drawn direct from the locomotive. A large number of freeze-ups were experienced with this system, as well as the overheating of the forward cars. In the vapor

system, now in wide use, the steam is taken from the locomotive. It is passed through a reducing valve and thence into the train line which is usually of 2-in. pipe. All train pipe valves in the entire train must be open. When steam appears at the rear of the train, it is allowed to blow for a few minutes until dry steam shows. The rear valve is then shut and immediately opened a little for "bleeding," and to prevent freezing. The vapor system is composed of three units: the vapor regulator, the cut-out steam heat valves and the heating coils or pipe. Mr. Rietz gave a detailed explanation, with illustrations, of these devices as developed by the Chicago Car Heating Company. The vapor regulator acts to receive steam from the train line at its pressure and corresponding temperature and convert it into steam or vapor under no pressure before it passes into the heating pipes inside of the car. The vapor cut-out valve controls the admission of heat to the radiating pipes by directing the flow of atmospheric pressure steam and, when desired, short-circuiting the steam, thus cutting off the heat in any particular car. The paper was accompanied by diagrams of arrangements of this system in four types of Pullman coaches. There was also included a table showing the number of feet of pipe required per foot of car length.

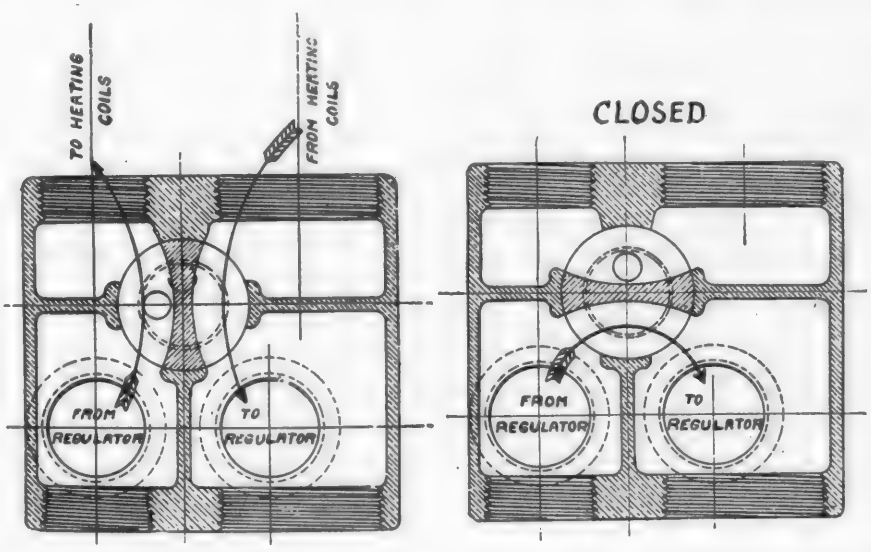
Mr. Hart said that the use of thermostats in railroad coaches was greatly to be desired, as it is no uncommon experience to find excessive temperatures, especially in sleeping cars.

F. K. Davis suggested individual heat control for every seat, and said that, even with 20 or 26 valves it would be an insignificant item when the average cost of $20,000 per car is considered.

J. H. Davis said the system described was a great improvement over the old Baker system. Mr. Hart called attention to the unique features of the four-way valve used with this system whereby steam was by-passed to the steam traps when not on the system thus preventing the traps from freezing.

Mr. Ohmes thought the method outlined in the paper marked a distinct advance in the method of heating railroad coaches, and when it is considered that such cars are likely to be operated in varying climates from the extreme north to Florida, he thought the system as outlined to be as good as could be expected.

A vote of thanks was voted to Mr. Rietz for his paper.



OPEN AND CLOSED POSITIONS OF THE VAPOR CUT-OUT VALVE FOR RAILWAY CAR HEATING.

Evening Session, January 16.

The opening paper at the evening session was entitled, "Some Notes on Warm Air Furnace Heating," by Jesse M. McHenry.

BOILER TESTING SESSION.

One of the principal items on the programme was then taken up, being the report of a committee appointed by the New York Chapter to consider a standard method for testing heating boilers.

The subject was introduced by Homer Addams who recounted the steps previously taken by the society. He felt that the efforts to rate boilers, as well as to test them, had been largely responsible for the shelving of the project in the past.

Mr. Addams urged the appointment of a permanent committee to devise a suitable testing code and to keep at work on it until it is perfected.

Percival H. Seward then presented the committee's report.

The report stated that the specific object of the test which the committee had in mind was the determination of the amount of steam which a boiler will furnish when burning a definite quantity of coal per hour in the manner for which it was designed. Therefore, the schedule (which accompanied the report) covering report of test, provided only for those items which the committee considered essential to determine the proper capacity of the boiler for commercial or sales purposes.

The duration of a general test, went on the report, should be 12 hrs. of constant running. Anthracite coal, stove size, such as Lehigh Valley, was recommended as the proper fuel to be used.

The recommendations made by a similar committee to the society in 1913 were concurred in and reiterated. These included the items of apparatus and instruments, and rules for conducting evaporative tests. One of the recommendations of the new committee was that tests be made at atmospheric pressure. The committee did not advocate the "running start" in use at many boiler plants. Rules were also given for stopping the test and weighing the unburned fuel.

The formula given by the 1913 committee for calculating the rating were included in the report in a modified form and endorsed, as follows:

Let C represent the pounds of fuel available for one firing period. Let T represent the time fuel available will last. Let E equal the total B.T.U. considered available per pound of fuel at boiler outlet, not exceeding results shown by tests.

Then $\frac{C \times E}{T}$ represents the boiler capacity per hour in B.T.U.

If rating is desired in equivalent square feet direct radiation, divide capacity in B.T.U. by 250 for steam and 150 for hot water.

The committee suggested that the report be placed in the hands of a special code committee for complete and final tabulation with due reference to the points brought out in the discussion.

The report was accompanied by a form for "report of test," including some 58 items.

This report brought on an animated discussion between many of the members as to the desirability of certain features together with the practicability of making such a code a standard.

Prof. Allen heartily endorsed the project, but suggested a longer testing period, than 12 hours, or, better yet, a multiple of the firing period of 8 hours (which would be 16 or 24 hours) urging that the error in a 24-hour test would be much less than with 8 or even 12 hours. He farther suggested that anthracite coal is rapidly going out of use, especially in larger installations, and recommended that the testing standard should be made flexible enough to take into consideration firing with bituminous coal. He approved the running of the boiler at atmospheric pressure during the test but recommended the "running start" rather than the method prescribed in the committees' report. He desired to have 4 or 5 hours' operation of the boiler under full steaming conditions before starting the test and believed that the use of recording instruments should be

carried out as far as possible. Also that the sample of flue gases should be obtained as a continuous sample rather than only at certain periods and questioned if it would not be difficult to determine the amount of unburned coal at the completion of a test.

Mr. McIntyre advocated 8-hour firing principally on account of the rating for most heating boilers being now made on this basis. He also agreed with Prof. Allen that the standard should cover soft coal, that a running start would be better and preferred a longer test for bituminous coal. He, too, thought it would be difficult to determine the amount of coal in the ashes at the finish of the test and suggested assuming a B.T.U. value of all coal and then a correction of the test readings later from an analysis of the coal. He claimed that the combustion of bituminous coal could easily be carried over 10 lbs. per square foot of grate with good results and recommended 20 readings per hour as well as weighing the residue to determine the amount of coal not burned. He stated that the fire bed might in some cases be more than 20 in. deep and that with bituminous coal greater efficiency is often obtained with the fire bed of greater depth.

Mr. Ohmes presented boiler charts and stated that two curves (which any manufacturer could plot) would be entirely sufficient to show any consulting engineer all that was necessary in regard to the boiler. These two curves consisted of an efficiency curve at various ratings and a curve of loads for various firing periods. He claimed that the most satisfactory boiler is the one which gives the highest efficiency at about 55% of its rating.

Mr. Donnelly suggested that the code be extended to include down-draft and magazine boilers.

Mr. Davis suggested that the subject be approached both from the manufacturers' viewpoint and that of the consulting engineers, and suggested that the principal object of testing a boiler was to see if the client was getting what he paid for. He recommended that the coal be specified as containing not less than a certain number of B.T.U., that the draft be limited to a maximum and minimum, that a surface blow-off be added to the washing out operation of cleaning the boiler, that a separator of given efficiency be used and that the test period should be extended to more than 12 hours.

Prof. Kent stated that the volatile matter which was given off by the unburned coal at the end of a given test would make the result doubtful and suggested burning down so as to leave just enough coal to start a new fire at the beginning of the test and then to stop firing so as to burn down to the same point at the conclusion. He also recommended a 16 to 24-hour run, a combustion rate of 4 lbs. per square foot and then a farther test at other rates of 2, 4, 6 and 8 lbs. pressure.

Prof. Allen brought up the point that on double-grate boilers a running start was a necessity.

Mr. Addams, the chairman of the committee, then explained that the committee assumed of course that there would be draft enough to burn the coal and that the coal would be of general average B.T.U. and moved that a permanent committee be appointed to perfect the standard of tests.

WORK ON BOILER TESTING CODE TO CONTINUE.

After much discussion regarding the membership of the committee it was finally decided to have it consist of nine members of which not more than four were to be connected with the manufacture of heating equipment. It was then voted to have the council appoint such a committee.

In conclusion Mr. Seward, who read the committee's report, explained that all of the points raised were of minor character to the main fact that a standard was desirable. He said that the committee had no objection to a 24-hour test or to the making of it with bituminous coal (or even wood), that rates of combustion could be made 5 to 10 or 3 to 12 lbs. as desired. He said a vote could be taken by the committee on the question of the "running start and "standing start." He agreed to self-recording instruments, continuous samples of flue gas, to the burning out of the unburned coal, to the stating of the

B.T.U. value of the coal, to a 24-in. depth of fire and to the preparation of efficiency charts, but he did not think that 4 lbs. of coal per sq. ft. per hour was practical

Morning Session, January 17.

The first paper at the Wednesday morning session was entitled, "Some Thoughts on the Durability of Materials Conveying Steam, Air and Water," by a member.

Some Thoughts on the Durability of Materials Conveying Steam, Air and Water.

In introducing his subject, which relates to the life of heating plants, the author cited the case of the Bankers Trust Company, at Wall and Nassau Streets, which was occupied in 1880 by the Manhattan Trust Building, in 1897 by the Gillander Building, and now by the Bankers Trust Building. As the cost of an apparatus is directly related to its durability, it is important to know how durable an apparatus is justified in any particular case. He then presented figures showing that the more expensive apparatus, if durable, would still be considerably cheaper after a period of 40 years, than the less expensive apparatus, if not durable.

The author went on to discuss outside corrosion and inside corrosion. His principal conclusion as to outside corrosion was that pipe laying in trenches or in conduits in the ground must be kept dry by proper underdrains. As to inside corrosion he stated that the only corrosion that takes place in a hot water heating system is in the vapor pipe from the expansion tank and in the expansion tank itself. On a domestic hot water supply line, however, he instanced a case where the pipe gave out after two years' service, due to improper aeration of the pipe system. Regarding steam heating systems, he stated that it is assumed and is pretty well established that steam does not corrode the piping, which is mainly due to the entire absence of free air in the steam.

Return pipes, said the author, constitute a problem the ultimate solution of which, perhaps, is to use ordinary steel or wrought-iron pipes for the steam lines, with a possibility of steam-driven pumps or even to use an occasional oil injection for the protection of the surfaces, and then reduce the return pipes to the minimum, but make them of brass or copper, with cast-iron fittings. The author also spoke of pipes carrying air and cited cases where condensation in such pipes had corroded the pipe.

The author concluded by stating that the use of cast-iron, due to its great corrosion-resisting qualities, is becoming daily of greater importance to heating engineers, for fittings, radiators, tempering coils and boilers. He strongly suggested that many pipe lines could be made of cast-iron, because simple flange joints could be used, and, he added, even threaded joints might be developed.

F. N. Speller called attention to the fact that it is not the water itself that causes corrosion, but the impurities carried by the water. Regarding the use of cast-iron, he said one of the principal difficulties was the impossibility of threading cast-iron pipe.

Mr. Otis said that in his experience a heating plant in the average office building will not last over twenty years.

Mr. Blackmore said that high temperature of the water will tend to corrode the pipes. This, he said, was not due simply to the high temperature of the water but to the high temperature of the air particles in the water.

Mr. Weinshank cited a case where the brass pipe gave out while the steel and wrought-iron pipe was not affected. This it was found, was due to the presence of sulphuric acid gas in the water. By pumping the water first to an open tank the trouble was remedied.

Mr. Nichols said that all of the pipes in the State Educational building in Albany were giving out, although installed only three years ago. This was found to be due to the presence of CO_2 in the water after passing through the sand filters, due to the decomposition of microbic substances.

When hard water is used, the pipes are often found filled with a flinty substance.

Pending further discussion, F. N. Speller presented his paper on a similar topic, being "A Method for Practical Elimination of Corrosion in Hot Water Supply Pipe."

A Method for Practical Elimination of Corrosion in Hot Water Supply Pipe.

Mr. Speller's paper was the continuation of a previous discussion of the subject in which he demonstrated that free oxygen and carbonic acid in water are the causes of practically all the trouble with hot water supply lines, as these gases are retained in the water with closed systems of heating. Two methods of removing these gases from water were described, with diagrams giving the percentage removed under various conditions. These were (1) by reducing the pressure of the heated water, as by the use of an "open" type heater under atmospheric pressure, or partial vacuum, or (2) by keeping the hot water in contact with a large surface of iron under pressure for a sufficient length of time to remove and "fix" the oxygen and carbon dioxide.

The latter principle has been in use at two plants during the past year, one of which is the Irene Kaufmann Settlement, in Pittsburgh. Mr. Speller then described at length the system of water treatment at this plant. The results showed that the average oxygen content of the water before treatment was about 8 c.c. per liter and, after treatment, 0.5 c.c. per liter.

A corrosion test was made in these pipe lines at the same time. The results showed that the pipes carrying deoxidized water were in use a month longer and carried 50% more water than other lines, but showed from 62% to 85% less corrosion, based on the deepest pitting in the pipe carrying untreated water. The best results were found with a steel pipe.

Mr. Speller's paper was accompanied by a number of lantern slides, including several arrangements of test apparatus, the general results showing marked reduction in the pitting when using deoxidized water.

Mr. Blackmore asked if the filter used with the deoxidizing apparatus was capable of removing all the rust accumulating in the deoxidizer.

Mr. Carrier said that in air conditioning work the presence of sulphuric acid in soft coal smoke was something that causes considerable trouble in corroding the pipes.

Mr. Wilcox said in some cases a float valve has been used which will open to allow the gases to escape from a hot water tank, but will close against the water. This, he said, had been effective in preventing rust.

An extra paper was then presented by Professor John R. Allen on "Comparison of Pipe Coil and Cast-Iron Sections for Warming Air." This paper was also illustrated by lantern slides. It was really a comparison of tests made on pipe coils and on Vento cast-iron heaters, made at the American Radiator Company's Institute of Thermal Research. Prof. Allen showed that under similar conditions the condensation in each type of heater is practically the same.

The principal conclusion reached by Prof. Allen was that the condensation depends almost entirely on the frictional resistance and not on the free area of the coils. In fact, Prof. Allen went so far as to say that, in his own opinion; it makes very little difference what materials are used in the coils or heaters, as far as the condensation is concerned.

One chart, drawn on logarithmic paper, was especially interesting as showing an exhaustive comparison, for a number of sections, of operating data for coil heaters and Vento heaters.

Morning Session, Jan. 17.

The Wednesday afternoon session proved to be largely a central heating session. The first paper was presented by J. H. Walker on "The Transmission of Steam in a Central Heating Sytem."

(This paper will be published in next month's issue.)

Replying to a question as to the scouring effect of the superheated steam in the "feeder" lines, Mr. Walker stated that no scouring effect had been noted,

as thermometer wells located for over a year in the lines, still showed the manufacturers' marks. He thought this was due to the dry steam and the straight runs. When there were turns, easy bends were used.

George H. Nichols, head of the engineering department of the New York State Architect's office, then presented a paper on "Efficiency of Underground Conduit."

Efficiency of Underground Conduit.

In this paper Mr. Nichols presented a definition and a standard method of arriving at the thermal efficiency of the various classes of material used for covering underground heating mains. He could see no reason why the heat loss from bare pipe should not be adopted as a standard efficiency basis. Mr. Nichols distinguished between the various types of construction by dividing them into classes: mains installed in a concrete or brick walking tunnel, and mains installed in some form of waterproof envelope.

After taking up the points to be considered in deciding on the type of insulation the author then presented the results of two tests which, he stated, were not given as a comparison of the materials of the two installations, but to show the average efficiencies that can be expected and the methods that can be followed in testing such installations. The efficiency of the insulating material as installed is, for one test (Central Islip) 91.9% and for the other test (Ward's Island), 83.9%.

Mr. Walker said that in taking bare pipe as a basis for figuring efficiency, it would be necessary to have the bare pipe tested underground. As for ventilating pipe tunnels, Mr. Walker said it would be necessary to have such ventilation, as otherwise the men could not work in them, owing to the heat.

Professor Allen said that if the bare pipe were buried deep enough there would be no need of any insulation.

Professor L. B. McMillan showed a chart giving a comparison of results on heat losses from different sizes of bare pipe. The tests included those made by the Massachusetts College of Technology, George H. Barrus, George M. Brill, Charles Eberle, C. L. Norton, Box, and the speaker at the University of Wisconsin.

Mr. Wells stated that in tests made by the American District Steam Company it was found necessary to have the pipes of the same diameter. It was also important, he said, that the tests be made under the same conditions and for the same length of time.

In the tests referred to, his company had four lines in operation at once. At first, saturated steam was used, but later it was found advisable to use superheated steam at 1° or 2° superheat. He stated that the efficiency of a pipe tunnel depends on the insulation used rather on the conduit itself. The loss by convection is the important factor.

Prof. Allen expressed surprise at Mr. Nichols's figure of $20.00 per running foot for pipe tunnel construction. He said his cost for this class of work was usually about $10.00 per running foot.

Mr. McColl said his experience justified the figure of $1.00 per running foot for each diameter of pipe used.

Mr. Walker said this might hold true for 6-in. or 8-in. pipe, but not for pipes of lower diameter, in which cases the cost would be higher proportionately. He also said that with the rising cost of labor it would be unsafe to use these figures in the future, but that allowance would have to be made for greater labor costs.

In closing Mr. Nichols said that if comparisons were to be made of bare pipe when actually installed underground, it would be necessary to specify the nature of the soil, etc. He therefore thought that the bare pipe basis, as he proposed, would be as satisfactory as any other. The tests, he said, although of short duration, were made at the ends of long runs. Replying to a question regarding the economy of central heating plants, he said there was undoubtedly an economy in institutional work where the buildings were of considerable dimensions.

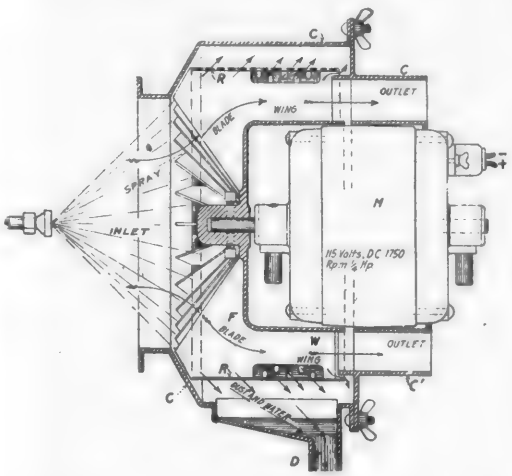
Dr. E. Vernon Hill of the Chicago Division of Ventilation then read a paper on "Windows."

The last speaker at the afternoon session was William J. Baldwin, who read

a paper on "An Improvement in Ventilating Apparatus," describing a unique type of fan designed by him and first demonstrated at the last midsummer meeting of the heating engineers' society in Detroit.

An Improvement in Ventilating Apparatus.

In this paper Mr. Baldwin described what he called an "aero-hydro fan-separator" a model of which he had on exhibition at last summer's meeting of the heating engineers in Detroit. The apparatus shown in the paper was designed for a hospital ship but it may be adapted for use, he said, in any place where it is desired to take in air in ample quantities, and exclude rain, or



LONGITUDINAL SECTION THROUGH THE AERO-HYDRO FAN SEPARATOR.

spray or dust. Photographs were included showing various features of the construction of this apparatus, but its principle of operation may be gathered from the accompanying illustration. In addition to its use on a steam ship, the apparatus may be used to take dust or cinders from the air of a chimney, to take care of soft coal smoke and for several industrial processes, including copper refining, the removal of tin, lead, zinc, etc., from hot gases, for car ventilation and as either a humidifier or drier. An important feature of the apparatus is that it is self-cleaning, whether wet or dry.

Before Mr. Baldwin demonstrated his machine, a topic for discussion was taken up on "Heat Transmission Through Various Types of Sash." This took the form of a discussion of Arthur N. Sheldon's paper on "Heat Transmission Through Various Types of Sash," presented at the recent annual meeting of The American Society of Mechanical Engineers and published in THE HEATING AND VENTILATING MAGAZINE for December, 1916.

The paper was read in abstract by Secretary Obert.

Mr. Baldwin in discussing this topic quoted the practice of Gen. Meigs, at one time Quartermaster-General of the U. S. Army, who allowed one-third less for double-glazing than for single glazing and for triple-glazing one-third less was again allowed between the second and third sash.

Mr. Davis said that with metal sash it is difficult to get a putty or other material that will stick to both the glass and the metal. He said it might be possible to have this tight in laboratory tests, but that the author of the tests quoted would find it impossible to maintain this tightness in ordinary practice.

M. S. Cooley said the fact that dust will sometimes accumulate on a double-sash window shows that there is a very considerable leakage through both sashes.

It was announced that as Dr. E. Vernon Hill had an interesting chart to present on air, a special topic would be introduced for his benefit on "Interior Air Conditions."

This chart was intended to aid ventilation inspection departments in making tests and remedying unsatisfactory air conditions.

Morning Session, January 18.

A symposium on drying was the feature of the Thursday morning session. Three papers on this subject were presented, one on "Artificial Drying, with Special Reference to the Use of Gas," by Gilbert C. Shadwell, of the Improved Appliance Co., Brooklyn, N. Y.; one on "Drying by Evaporation," by F. R. Still;

and a third on "Drying in Industrial Plants," by J. O. Ross, of the B. F. Sturtevant Co.

Artificial Drying, with Special Reference to the Use of Gas.

Mr. Shadwell's paper was a strong indorsement of the use of gas in drying processes. He described in particular a type of heater or hot air generator, manufactured for drying work by the Improved Appliance Co., of Brooklyn, N. Y. Several examples were given of the use of this apparatus for various drying processes, as well as the calculations used in sizing the installations.

Mr. Shadwell presented the advantages in the use of gas for drying that developed into a lively discussion on the part of the gas and solid fuel drying advocates. Among the advantages of gas presented by Mr. Shadwell were the fact that no storage capacity is required, easy heat control is possible, it is capable of taking care of large as well as small installations, while it is so safe that watches are being dried by gas heat, as well as photographic films. In drying fish it was pointed out the use of the drying process on damp days had effected an enormous saving. Mr. Shadwell put in a plea that the heating engineers take a wide interest in the use of gas heat, not only in industrial processes but in auxiliary house heating.

Dr. Franklin thought the society should procure comparative prices of coal, gas and electric current throughout the country. He said that radical changes were coming in the art of gas burning, and that the rising prices of coal were coming to have an important bearing on the matter.

Mr. McIntyre said it was important to have the air inlets and outlets properly placed, as during the process it is often necessary to change these locations during a given operation.

Another point brought out was that although on paper the difference in the heat content of coal and gas greatly favored the use of coal, the efficiencies possible in the application of gas made this difference disappear. A case was cited in the melting of asphalt in which gas was beating out the solid fuels. When the handling of coal and the speed of drying is taken into consideration, there are very few operations that cannot make use of gas to advantage.

Mr. Carrier said that while gas may be used to better advantage in small plants, operating intermittently, he felt that the gas interests were hurting their case in urging gas as a substitute for steam in large installations. He said that it must be remembered that gas at 80c per 1,000 cu. ft. compared with soft coal at $5.00 per ton gives 900,000 B.T.U. for $1.00 for gas as against 5,000,000 B.T.U. for the same cost in coal, or a ratio of about 1 to 5½. He appreciated the efficiency of application with gas, but considered that there was a limit to this advantage.

In closing Mr. Shadwell compared the proposition to the use of an automobile and buggy. An automobile may cost more, but it is acknowledged to be better and is supplanting the buggy. He said the comparative heat values of the fuel are not the determining factors, but the final cost of the product.

The discussion of Mr. Still's paper was deferred until Mr. Ross's paper had been presented.

Drying in Industrial Plants.

Mr. Ross describes the principal drying processes now in use, commencing with the filter press, or squeeze rolls generally used in the clay and chemical industries. The settling tank was then described, in general use in the starch industry in Europe. Evaporating kettles were next taken up.

One of the first decisions to be made, he said, is whether the dryer should handle the material continuously or in batches. A progressive dryer in which the material moves gradually or continuously, either on trucks or conveyors, offers many advantages in cost of labor and economy of heat. The drawbacks of this process were given by Mr. Ross as:

1. When the material comes from the machine in batches;
2. When the variety of the material differs widely in drying requirements;

3. When the material requires different treatment than a gradual increase in temperature and decrease in humidity of the air.

He also said that material which dries fast is more adaptable to a progressive dryer than material which dries slowly.

Mr. Ross gave a description of the so-called bed or screen type of dryer, consisting of a horizontal screen on which the loose material to be dried, is thrown. Still another type described was the cylindrical type, consisting of a round cylinder usually on an incline.

A discussion of these papers brought out the part being played by the commercial engineer, one speaker stating that one of the troubles in connection with the use of drying apparatus was due to the desire of the salesman to make as large a sale as possible.

Mr. Davis said that 70% of the advance in this field was due to the commercial engineer, and that so long as the owners failed to appreciate that the salesmen's time was as valuable as the consulting engineer's, there would probably be the practice of providing for this item in the extra apparatus sold. He said that the commercial engineer's time should be paid for, whether or not he secured the order.

Mr. Carrier said it should be borne in mind that every finished product has a normal amount of moisture, ranging from 5% to 15%, so that the drying process never means the entire drying of the product.

In concluding the discussion Mr. Still said it was the province of the society to determine what is 100% in drying. It would then be up to the specialist to determine his own factor of safety. He suggested that committees be appointed to formulate such standards.

President Hart announced the death of Alfred E. Kenrick, a former president of the heating engineer's society, who died January 16, at his home in Brookline, Mass. On motion made by Mr. Chew it was voted to have the council formulate a suitable resolution and appoint a committee to attend the funeral.

Before the session adjourned, a resolution was read providing for the appointment of a committee to co-operate with the National Association of School Accounting officers, the American Institute of Architects and the National Education Association in formulating standard school building measurements, so that any discussion of such measurements would be on the same basis.

This matter was brought to the attention of the society by Edwin C. Baldwin, of the Massachusetts Board of Education.

Afternoon Session, January 18.

The final session was opened with the presentation of a paper on "Heating, Ventilating and Electrical Equipments of the Philadelphia Public School Buildings, High and Elementary," by J. D. Cassell, chief of the engineering department of the Philadelphia Board of Education.

Frank G. McCann thought that a pressure on cast-iron radiators of 30 lbs. per square inch was too high. In answer to this and other questions Mr. Cassell stated that he had used a 30-lb. steam pressure for 25 years, and had never experienced any trouble. There was at times some hissing noise in the radiators, but this, he said, was not due to the pressure, but to the action of the thermostats.

Regard the amount of coal burned per year, Mr. Cassell said that in one building containing 360,000 cu. ft. of space, the consumption for one year was 150 tons of pea coal, or 1.2 lbs. per cu. ft. per year. This building, however, contains from 18% to 20% of glass surface while the newer buildings have from 25% to 30%. Mr. Cassell also spoke of a difference of 50 tons in the fuel consumption in one year for two buildings of similar construction, showing that such figures should be accepted with some caution.

A paper on "Heating and Ventilating a Portable School House," was presented by J. R. McColl.

Mr. Cassell, in discussing this paper, paid a high tribute to the author's design for this type of apparatus. No uniformity of results, he said, can ordinarily be obtained with gravity furnace

heating, but with a fan the desired uniformity can be obtained. No humidity devices were used, said Mr. McColl, in answer to a question, as the buildings were located some distance from the main school building and it was not found convenient to run a water line to the portable buildings. At first the motors, which were of ½ h.p. were noisy, but this was remedied by placing them on concrete or brick foundations. The fan is run continuously when the school is in session.

The concluding paper was on "Remodeling the Ventilation of a Theatre," by Samuel R. Lewis.

MOVEMENT TO ESTABLISH RESEARCH LABORATORY.

An item of business came up at this point in connection with a proposition to establish a fellowship at the University of Michigan. Mr. Lyle favored the proposition of establishing a chair of engineering research by the society. It was estimated that the total cost of a fellowship would be about $1,600 a year. Mr. Hart thought that if the society should undertake to establish a bureau of research, it could probably enlist government aid to cover a portion of the expense.

On motion of Mr. Boyden it was voted to appoint a committee to consider the establishment of a research laboratory. Mr. Still said that the U. S. Bureau of Standards had stated that the engineering public does not appreciate the opportunities it offers for making desired tests and investigations and he thought the society could get many tests made by the Bureau of Standards if it went about it the right way.

INSTALLATION OF OFFICERS.

President Hart, after thanking the officers and members for their support, appointed Frank K. Chew and James H. Davis a committee to escort the newly-elected officers and members of the council to the platform. They were then installed with due ceremony, President Lyle responding to the retiring president's welcome by pledging his efforts to promote the society's interests during the coming year.

Suitable responses were made by the other officers, including Secretary C. W. Obert, who was given liberal credit for his conscientious and effective work during the past year.

The meeting then adjourned.

The Entertainment.

Between luncheons, matinées and dinner parties the ladies were given a full round of entertainment throughout the meeting. On the opening day, Tuesday, they were taken to the Strand Theatre, where the moving pictures were supplemented by a musical programme. That evening the ladies, in charge of W. H. Driscoll, H. G. Issertell and W. G. Le Compte, were taken to Churchill's for dinner, staying for the cabaret.

Wednesday afternoon the committee selected "Old Lady 31" at the Thirty-Ninth Street Theatre as the play for the matinée Party. This proved a delightful comedy, with an undercurrent of pathos that has made the play widely known among theatre-goers. Messrs. Issertell and J. Barton Garfield accompanied the party.

The annual dinner of the society was scheduled for the same evening at the Hotel Astor. This proved a most delightful event. The beautiful Rose Room on the Forty-Fourth Street side had been secured for the occasion and, both in its appointments and setting, the dinner was pronounced one of the most attractive the society has ever held. R. W. Pryor, Jr., who had direct charge of the dinner arrangements, came in for high praise for the success of his plans.

It was not intended that there should be a lengthy programme of speeches, so those scheduled to speak included only the retiring president, H. M. Hart; the new president, J. Irvine Lyle; and Charles N. Green, attorney for the American Brass Company.

Mr. Hart, who acted as toastmaster, made a witty speech, appropriating due credit for the prosperity of the society as well as of the country in general. Before he concluded, however, he took the opportunity to thank his associates for their splendid work during the past year.

President-elect J. Irvine Lyle was then introduced and was warmly greeted. Mr. Lyle gave a thoughtful address on the efforts of the Government to promote agriculture and the need of securing the same sort of government assistance for engineering. The United States Government,

he said, has spent millions of dollars in agricultural extension work, through the establishment of experiment stations. The results of its investigations are placed before the farmer in such a way that he can make use of them. The whole movement is to further farm economics. But what about the skilled mechanic, asked the speaker. There are no experimental stations for his benefit, with the exception of the Bureau of Standards. A bill is now before Congress, he said, to establish experiment stations at the different universities for the benefit of the engineer. This, he said, was a move in the right direction and he urged a wider interest in this matter on the part of the engineering profession.

Mr. Lyle's address was well received, the applause indicating enthusiastic approval of the suggestions presented.

After a period of dancing between the courses, the final speaker Charles N. Green, was introduced. Mr. Green spoke on "Efficiency in Manufacturing Work." His references were chiefly to the correct selection of men for particular positions. He pointed out the characteristics of the methodical man and compared them with those of the man "out of a rut." He said the time has come when haphazard methods of selected men must be abandoned and men selected for particular positions only after their characteristics had been studied.

A novelty was introduced at the close of the dinner in the form of a glee club concert by 35 members of the Friendly Sons of St. Patrick. This club was rehearsing in another part of the hotel and were introduced through the courtesy of William H. McKiever, of New York.

Three songs were rendered by the glee club, including an old Irish battle song and a very old lullaby. All three songs were finely rendered and won hearty outbursts of applause.

This concluded the dinner programme and the room was then given up to dancing to the music of Muller's orchestra.

Friday morning the ladies met at headquarters and were taken in Black and White taxis to Wanamaker's by Messrs. Kiewitz, LeCompte, Dornheim and Garfield. Here they were shown through the store by guides, visiting the antique shops, the "Palace Palatial," the hospital and store school. Luncheon was served in the tea room at one large table and the party then proceeded to the auditorium where the programme included several organ compositions and a number of songs by three soloists

The following members of the Entertainment Committee were on duty in the lobby or took an active part in carrying out the programme: A. S. Armagnac, chairman; R. W. Pryor, Jr. (dinner), B. K. Strader (dinner), W. H. Driscoll (ladies), P. H. Seward (finance), George D. Farnham (programme), G. A. Dornheim (programme), M. W. Franklin (speakers), W. H. McKiever, Walter S. Timmis, A. E. Carpenter, Jr.; W. G. LeCompte, H. G. Issertell. J. Barton Garfield also served actively with the committee.

New Chapter Formed in Kansas City.

On the application of twenty-seven members of The American Society of Heating and Ventilating Engineers in and near Kansas City, Mo., a charter has been granted for a local chapter of the society at that point. Pending action by the society the chapter elected the following officers at a meeting in Kansas City in January:

President, Prof. J. M. Kent; vice-president, B. Natkin; secretary, F. A. DeBoos; treasurer, E. A. Cline. Members of council; John H. Kitchen, Herbert H. Whitten and Walter Gillham.

The following have joined the chapter or have signed applications for membership:

Herbert H. Whitten, James M. Kent, John H. Kitchen, R. F. Taylor, Ben. Natkin, Wm. Mallis, F. A. DeBoos, E. A. Cline, Prof. J. D. Hoffman, B. R. Hull, Leslie Byson, B. A. Broom, Walter E. Gillham, E. C. Waddington, M. N. McIntyre, R. L. Dunlap, F. A. Griffin, Martin Hauser, L. A. Stephenson, John G. Pease, F. J. McMorran, W. W. Howe, F. Chockley, W. B. Irwin, H. H. Wright, A. R. Hardy and H. N. Booth.

Illinois Chapter Hears Address on Smoke Abatement.

An address by J. W. Henderson, chief of the bureau of smoke regulation of Pittsburgh, Pa., was the principal feature of the January meeting of the Illinois Chapter, which was held at the Engineers' Club, Chicago, January 8. Mr. Henderson told the fifty members and guests who attended the meeting about the progress that has been made in smoke abatement in Pittsburgh, Pa. In lantern slides which

accompanied his address some remarkable comparisons were shown between conditions before and after the smoke abatement campaign was undertaken.

Mr. Henderson prefaced his remarks by stating that smoke abatement is fundamentally a heating and ventilating problem. He cited a case in point where a heating boiler for a garage was placed in a cement basement room which was practically air-tight when the door was closed. No provision was made for letting the air into the room, as the walls were all solid.

The single-grate boiler, he said, cannot be operated without smoke within even the limitations of the liberal smoke ordinance of today, using Pittsburgh vein bituminous and similar long-flame coals.

The experience of Pittsburgh has proven that it is always best to use mechanical stokers. The next best alternative is semi-mechanical stoking, when the requirements are such as to call for tubular boilers.

Mr. Henderson stated that the production of smoke in Pittsburgh has been reduced more than one-half during the two years and ten months that smoke abatement has been systematically pushed. Moreover this result has been accomplished with no prosecutions thus far under the present administration. There are, however, a few concerns, said Mr. Henderson, that seemed destined to impel the city to take such steps to secure obedience to the law. The shortage of natural gas during the winter months and sudden reverting to the use of soft coal brings many new cases to the front all the time, so that smoke abatement in that city is not fully accomplished, by any means.

In concluding he stated: "There is not a boiler, furnace or metallurgical furnace stack that cannot be made to comply with the smoke ordinances of most cities." The Pittsburgh ordinance prescribes that the production and emission of dense smoke for an aggregate of one minute in any period of eight minutes, for locomotives and steamboats; and two minutes in any period of 15 min., for stationary stacks, constitute a violation punishable by fine or imprisonment or both.

Mr. Henderson was given a rising vote of thanks. The usual chapter dinner preceded the address.

Address on "Proportioning Radiation" Before the Michigan Chapter.

Ralph Collamore of Detroit was the principal speaker at the January meeting of the Michigan Chapter which was held January 5 and took the form of a joint meeting with the Detroit Engineering Society. Mr. Collamore's subject was "A Method of Proportioning Direct and Indirect Radiation." The address was followed by a lively discussion in which the members of both organizations took part.

The chapter adopted a resolution recommending a uniform method of testing boilers.

Four applications for membership were received and accepted, making the total membership of the chapter 77.

NATIONAL DISTRICT HEATING ASSOCIATION

Programme for Ninth Annual Convention.

An elaborate programme of papers and committee reports has been prepared for the ninth annual convention of the National District Heating Association, which will be held in Detroit, June 12-15, 1917. Prof. J. D. Hoffman, of the University of Nebraska, will present a paper on "A Study of District Heating in the Central West." Nelson S. Thompson, of the Supervising Architect's Office, in Washington, will have a paper on the "Central Heating and Lighting System of the Government's Buildings." Other papers will be: "Rates and Rate Making," by Halford Erickson, formerly chairman of the Railroad Commission of Wisconsin; "Heat Losses from Mains under Various Conditions," by R. C. March, of Chicago; "Ash- and Coal-Handling Problems," by J. L. Hecht of Chicago and G. W. Martin, of New York; "Special Furnace Design and Boiler Insulation" and "Use and Results from Indicating and Testing Instruments in the Boiler Room," by Joseph Harrington, of Chicago.

Prof. John R. Allen, of the University of Michigan, will deliver an address on experiments with heating and other apparatus which he has been conducting at that university.

Sub-committee reports will include one on "The Use of the Bonus System in the Boiler Room," by Messrs. De Wolf, Harrington and Hobbs; another on "Feed Water Treatment," by Messrs. Vater, De Wolf and Shaw; and a third on "Recent Station Progress."

Fred R. Still, chief engineer of the American Blower Co., Detroit, Mich., has sailed for Belfast, Ireland, where the plant of Davidson & Co., the original manufacturer of Sirocco fans, is located. Mr. Still will inspect some new fan designs which have been developed at this plant.

LEGAL DECISIONS

Radiator Patents.

In a suit for infringement of patent for a radiator, the Circuit Court of Appeals, Second Circuit, in reversing a decree of the District Court, S. D., New York, the Court said:

"We have held that claims 1 and 2 of the Fowler & Wolfe patent, No. 609,800, for radiators read in connection with the specification, while of narrow scope, are valid. Fowler & Wolfe v. McCrum-Howell Co., 215 Fed., 905, 132 C. C. A., 143, to which reference may be made for a fuller statement of the facts. The radiator of that patent is a cast-iron section or unit containing four outside large hollow tubes and two or more similar cross tubes, the latter being connected by smaller connecting tubes. It is primarily a wall radiator and being the first of such in the art was a great success. These sections may be united to make radiators of any size desired. A particular advantage mentioned in the specifications is that increased radiating surface may be had without taking up floor space. The feature we held to be patentable was that the cross tubes, being larger and longer than the connecting tubes, a better circulation of hot air or water whichever was used, was secured. Of course the heating principle is the same in a floor as in a wall radiator. Several earlier patents for floor radiators, notably Wood, No. 176,915, and Safford, No. 355,216, were relied upon by the defendant in the former case. We held them to be no defense, because they did not show the relative difference in size between the cross and the connecting tubes above pointed out.

"In this case, however, there are produced two floor radiators manufactured some years before the Fowler & Wolfe patent was applied for, the Jarecki and the International, which are made up of unitary sections of four large outside tubes, two large cross tubes with two smaller connecting tubes. This is the construction of the Fowler & Wolfe patent. The fact that there are fewer connecting tubes than those appearing in the drawings of that patent and that they are shorter is immaterial, because it calls for a series without prescribing any particular number or any particular length of the connecting tubes. Moreover, it makes no difference whether the cross tubes are of a perpendicular or horizontal position. We think that a radiator made after the Fowler & Wolfe patent, though with but from two to five connecting tubes and shorter than the series of six appearing in the drawings of the patent, would unquestionably infringe, and conversely, if in use before the patent was applied for, would anticipate it. The principle of construction and the function is the same, and accomplished in the same way; the difference being only one of degree.

"In view of the prior uses now established, the decree of the District Court is reversed." Fowler & Wolfe Mfg. Co., vs. Richmond Radiator Co., 234 Fed., 635.

Acceptance of Bid for Installation.

An action was brought to recover profits which plaintiff would have made in the performance of a certain contract with the defendant, had it been allowed to enter into and perform that contract. The plaintiff recovered a judgment, based upon the verdict of a jury, for $1,162.26.

The plaintiff is engaged in the business of installing heating and ventilating plants in public schools and buildings. The defendant is a corporation having charge of the educational interests of Manhasset in the town of North Hempstead, Long Island. The plaintiff, pursuant to an advertisement for the construction of a new school building by the defendant at Manhasset, submitted a bid for the construction of the heating and ventilating plant. The advertisement stated that information concerning the work to be done could be secured from Frederick H. Briggs, an architect, at Plandome, L. I. The plaintiff, through its then secretary, communicated with Mr. Briggs, and in answer to that communication received a letter from Briggs, stating where plaintiff could get a set of blue-prints and specifications for the construction of the new school. This letter also stated that sealed proposals would be received by the clerk of the board of education until January 8, 1915, up to 7:30 p. m., for the general construction of the new high school.

On January 8, 1915, the plaintiff's representative, Mr. Textorious, appeared before the board of education and submitted plaintiff's bid, together with a certified check for 5 per cent of the amount of its bid, and a surety company bond. The bid of the plaintiff proposed to furnish all the material, labor, and install complete the heating and ventilating plant in accordance

with the plans and specifications for $5,216. Thereupon the board proceeded to open and announce the names of the bidders, and the amounts of the bids were placed on a blackboard under separate heads, and remained there throughout the evening. On the blackboard the plaintiff's bid of $5,-216 appeared as the lowest bid for the ventilating and heating. After opening the bids and putting them on the blackboard the board went into an executive meeting in an adjoining room. While they were in session a member of the board named Bellows came out of the meeting and told Textorious that the contract had been awarded to the plaintiff. Bellows also said it would not be necessary for Textorious to remain there, that they would not enter into any contract before they had sold their bonds, and that the contract was plaintiff's when they had sold the bonds.

It appeared from the minutes of this meeting, which were put in evidence by the plaintiff, that the bid of the plaintiff was accepted in the following words:

> "Under date of the special meeting of the board of education on Friday, January 8, 1915: Regularly moved, seconded, and carried that the Johnston Heating Company's estimate for the heating be accepted, provided the bonds are sold—estimate, $5,216."

The board then adjourned to hold a special meeting on January 8, 1915, when the minutes of January 8th were approved. On the following day the witness Textorious, representing plaintiff, had a conversation over the telephone with Mr. Bellows, in which conversation Bellows stated again that the contract had been awarded to the plaintiff. Thereafter, and on or about January 13th, the plaintiff received a letter from the clerk of the defendant, returning his check and bond, and telling plaintiff that Hynes Bros., of Great Neck Station, had been awarded the contract for heating and plumbing. It appears from the minutes of January 9, 1915, that the resolution to accept the estimate of the Johnston Heating Company was rescinded and the certified check directed to be returned. At the same meeting a resolution was adopted accepting the estimate of Hynes Bros., not only for the plumbing, but for heating, in one bid aggregating $10,285. When the plaintiff received the notification that the contract for heating and plumbing had been taken away from it and awarded to Hynes Bros., of Great Neck, it notified the defendant of its willingness to enter into a contract and comply with all its terms and conditions. The defendant refused to allow the plaintiff to perform, and did not readvertise for bids, but went ahead and advertised for the sale of the bonds, and the bonds were finally sold.

The plaintiff claims that its bid was fully accepted, and the acceptance communicated to the plaintiff, in a way to bind the defendant, and that that acceptance constituted a contract between the parties, although no formal contract had as yet been executed. The defendant, on the other hand, claims that there was no acceptance, and consequently there was no contract, and that the court should have dismissed the complaint.

On appeal from the judgment the Court said:

"It is apparent from this testimony that the plaintiff was the lowest bidder, and that his bid had been accepted by resolution of the board; but there is no evidence that the acceptance was ever communicated to the plaintiff by any person acting under authority of the board. It may all be true that Mr. Bellows told plaintiff's agent that the bid was accepted (although Bellows denies this); nevertheless it is not shown by any evidence whatever that Bellows had any authority to make this communication on behalf of the board. In the absence of an authorized notice of acceptance of plaintiff's bid, the board had a perfect right to rescind its resolution accepting plaintiff's bid. The question of the legality of the board's action in accepting some other bid in place of plaintiff's is not now before this court. We simply decide that the board's action in revoking its acceptance of plaintiff's bid was quite within its legal right."

It was held that there was no evidence to go before the jury and that the action should have been dismissed. Johnston Heating Co., vs. Board of Education, New York Appellate Division, 161 N. Y. Supp., 867.

Current Heating and Ventilating Literature.

Under this heading is published each month an index of the important articles on the subject of heating and ventilation that have appeared in the columns of our contemporaries. Copies of any of the journals containing the article mentioned may be obtained from THE HEATING AND VENTILATING MAGAZINE *on receipt of the stated price.*

HEAT LOSS

Heat Loss Through Buildings and Building Material. R. S. Hawley. 500 w. Col Sl Min Qt—July, 1916. Self-explanatory chart with notes.

PIPE COVERINGS

The Effect of Surface Conditions Upon the Rate of Heat Transmission Through Steam Pipe Coverings. A. D. Fulton and R. C. Parlett. 2500 w. Wis Engr.—Nov., 1916. Serial, 1st part. Thesis for degree of Mech. Engr. Research work.

Fresh Air for Submarines.

A recent announcement stated that a new process for supplying pure air to submarines have been invented by William G. Bond, of Wilmington, Del. The air, it was stated, is purified by a chemical reaction between carbon dioxide and certain solutions exposed to the atmosphere of the chamber, the carbon being absorbed and the oxygen liberated. A test chamber was made 3 ft. x 4 ft. x 6 ft. and in a demonstration of the apparatus the inventor remained in the test chamber for 7 hours with only the air furnished by his device.

The test room used was entirely surrounded by water. Mr. Bond entered the tank clad in a bathing suit and supplied with reading matter, food, air testing apparatus and the chemicals. He kept in communication with the observers on the outside by means of a telephone. At a stated time the supply of oxygen furnished by the apparatus was cut off and he remained for three-quarters of an hour longer in the chamber. Although the air had been perfectly wholesome for seven hours, at the end of the additional 45 min. the inventor emerged breathing very heavily.

In writing of his invention, which is described as the Scott-Bond process for purifying air, Mr. Bond, states:

"This process relates to a process whereby carbon dioxide may be removed from air and the oxygen equivalent thereof may be continuously and automatically returned to the air. The process is founded on perfect theoretical chemical principles and with one passing of the air fulfills both the regenerating and purifying functions; that is, the supplying of oxygen, absorption of carbon dioxide, and the purifying of the air of its other toxic constituents.

"The machine itself consists of a nest of shelves submerged in a container, the air being brought into contact with the liquid by means of a blower fan or any other means of propelling same.

"The process is purely a chemical one and is operative by and therefore proportional to the carbon dioxide, and does not depend on the humidity, as the oxylithe process does. We have never found any fixed relation of humidity and carbon dioxide in exhaled air.

"The curves from our experiments shows our process to be very flexible. The oxygen and carbon dioxide lines follow each other as they theoretically should, varying with such changes as would naturally affect them; namely, changes in volume of carbon dioxide, volume of air passing through machine, and area of exposed chemicals.

"The process is capable of being manufactured so that one charge would last about twelve hours and by having an extra set of trays the new charge could be inserted in less than five minutes. The volume of air passing through the machine could be constant and no regulations would be needed for any change in rate of vitiating air. If the air should be vitiated before starting the machine, the machine would purify the air after being started."

Shall Clocks Be Set Ahead One Hour?

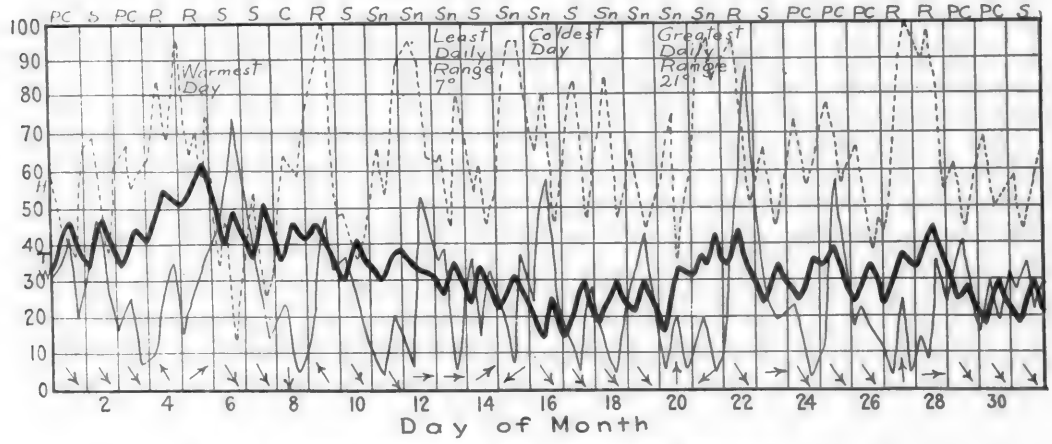
One of the important items on the programme of the fifth annual meeting of the Chamber of Commerce of the United States, held in Washington recently, was the subject of daylight. Robert Garland, chairman of a committee which has been studying the question, made definite recommendations for the setting ahead of clocks one hour. It was pointed out that Germany, France, England and Italy and other countries have adopted this system, while Cleveland and Detroit, in 1914, set their clocks an hour forward. Reports from officials and commercial organizations in these cities stated that the change was made without difficulty and has met with practically universal favor.

A course in ventilation and ventilation measurements is announced by the College of the City of New York. The course is conducted by George S. Palmer, M.S., chief of investigating staff, New York State Commission on Ventilation. Sessions are held on Thursday evenings, beginning February 8, from 8:25 to 10:13 o'clock. The course is offered to meet the needs of those whose daily work brings before them problems of ventilation, teachers, nurses, medical inspectors, assistants in the offices of heating and ventilating engineers, contractors and manufacturing concerns. The fee for the complete course is $5.00.

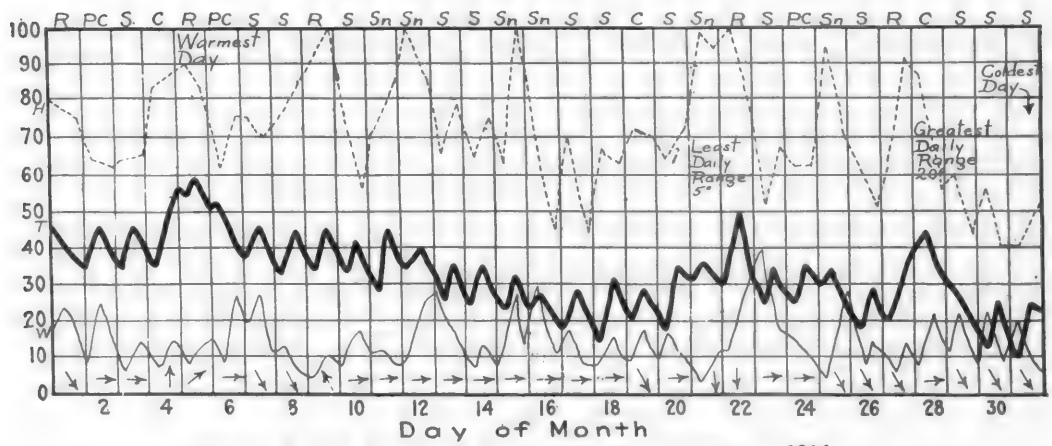
Central Supply Association will hold its winter meeting in Chicago, at the Congress Hotel, February 28.

The Weather for December, 1916.

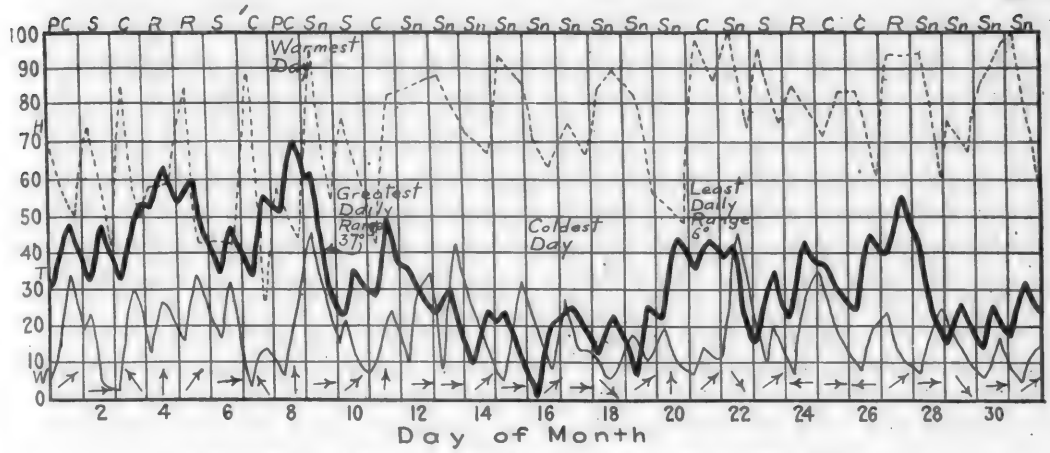
	New York	Boston	Pittsburgh	Chicago	St. Louis
Highest temperature, degrees F.	62	59	70	64	71
Date of highest temperature	5	5	8	7	4
Lowest temperature, degrees F.	15	10	1	—2	2
Date of lowest temperature	16	31	16	22	15
Greatest daily range, degrees F.	21	20	37	33	36
Date of greatest daily range	20	27	9	8	16
Least daily range, degrees F.	7	5	6	6	4
Date of least daily range	13	21	21	9	21
Mean temperature for month, degrees F.	33.8	33	33	26	33.6
Normal mean temp. for month, deg. F.	34.4	31.6	34.7	29.3	35.5
Total rainfall, in.	3.97	3.0	2.01	2.58	2.16
Total snowfall, in.	13.7	9.5	5.8	7.1	2.5
Normal precipitation, this month, in.	3.45	3.41	2.73	2.07	2.23
Total wind movement. miles	15335	9447	9385	9778	10815
Prevailing direction of wind	N.W.	W.	W.	N.W.	S.
Average hourly wind velocity, miles	20.6	12.7	12.6	13.1	14.5
Number of clear days	9	14	6	15	12
Number of partly cloudy days	12	7	6	5	7
Number of cloudy days	10	10	19	11	12
Number of days on which rain fell	16	12	13	16	8
Number of days on which snow fell	10	6	15	13	6
Snow on ground at end of month, in.	None	Trace	Trace	0.4	None



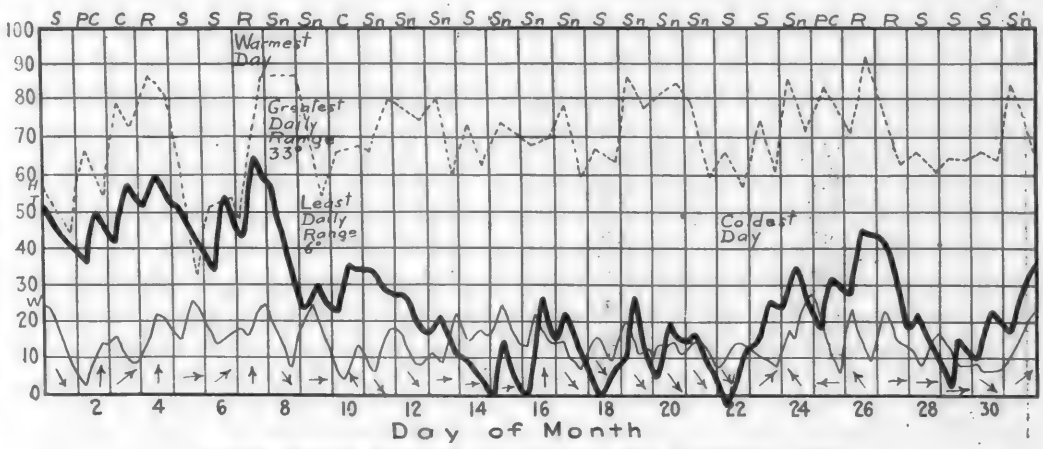
RECORD OF THE WEATHER IN NEW YORK FOR DECEMBER, 1916.
(Hourly Observations of the Humidity Are Recorded on This Chart.)



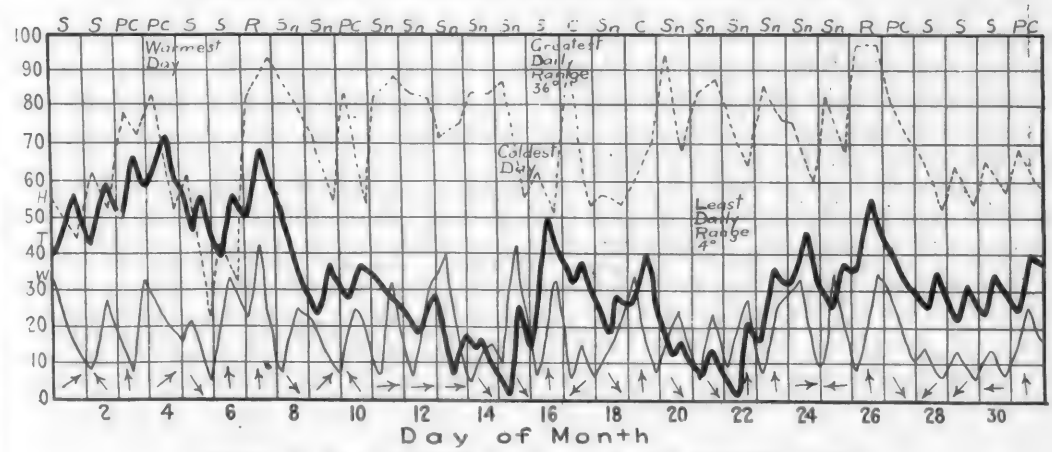
RECORD OF THE WEATHER IN BOSTON FOR DECEMBER, 1916.



RECORD OF THE WEATHER IN PITTSBURGH FOR DECEMBER, 1916.



RECORD OF THE WEATHER IN CHICAGO FOR DECEMBER, 1916.



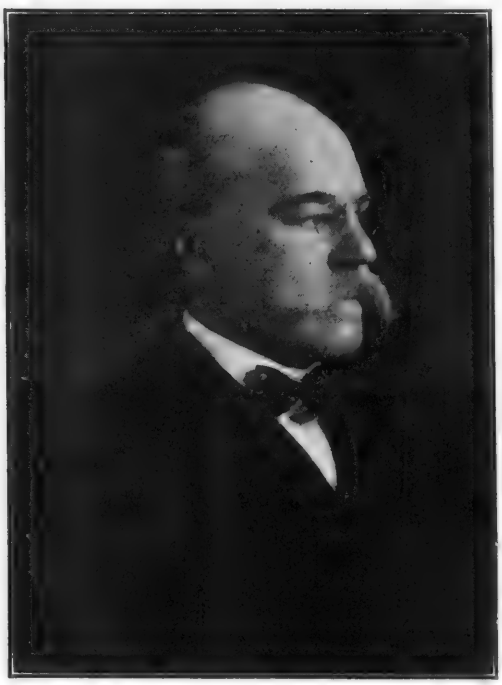
RECORD OF THE WEATHER IN ST. LOUIS FOR DECEMBER, 1916.

Plotted from records especially compiled for THE HEATING AND VENTILATING MAGAZINE, by the United States Weather Bureau.
Heavy lines indicate temperature in degrees F.
Light lines indicate wind in miles per hour.
Broken lines indicate relative humidity in percentage from readings taken at 8 A. M. and 8 P. M.
S—clear, P C—partly cloudy, C—cloudy, R—rain, Sn—snow.
Arrows fly with prevailing direction of wind.

Death of Alfred B. Jenkins.

A notable figure in the heating trade and a man who had a prominent part in the development of the steam fitting industry in this country passed away when Alfred B. Jenkins, president of Jenkins Bros., New York, died December 29, at his home in Llewellyn Park, West Orange, N. J. He had been in failing health for some time, the immediate cause of death being hardening of the arteries.

Mr. Jenkins was 68 years old. He was a son of Nathaniel and Mary Tucker Jenkins, and was born in Boston, Mass., in 1848. The business in which Alfred B. Jenkins was so vitally interested for upwards of forty years was founded by his father, Nathaniel Jenkins, who in 1864 first interested himself in the invention of water faucets, and opened a place of business at 52 Sudbury Street, Boston. Nathaniel Jenkins had conceived the idea of having his faucets fitted with renewable packings of rubber. To make these faucets satisfactory to his customers and users, he soon found that it would be necessary to have the packings made of a material which would stand hot water service. Compositions which would withstand any degree of heat were then unknown, and rubber manufacturers to whom he applied informed him that they could not be had.



ALFRED B. JENKINS.

As he could not purchase, he decided to manufacture. He went to the public library, and made a study of rubber and methods of mixing compounds, and installed in one of the lofts at 52 Sudbury Street a rubber vulcanizer and other necessary apparatus. After several years of experimenting, he invented a rubber compound which would not only stand hot water, but also *steam*. He also invented a steam valve, and obtained a U. S. patent thereon in 1866, as well as several medals and diplomas from the Massachusetts Charitable Mechanics Institute. The faucets then had little attention as all his efforts were now devoted to the production of a valve for steam service, and the manufacture of packing suitable for steam and hot water joints.

During 1866 and 1867, several additional U. S. patents were granted him for inventions or improvements in valves and packing, and, after various types had been tried, he invented and in October, 1868, obtained a patent on the type of valve which is now known all over the world as the Jenkins valve.

The corner stone having been laid, the next step was the introduction of the goods. With very little capital and an entirely new field of business and with very few acquaintances in the trade, it is not surprising that slow progress was made at the start.

In 1868 Charles Jenkins was taken into partnership with his father, and so continued until the death of Nathaniel Jenkins in 1872, when, to continue the business, his two sons Charles and Alfred B. Jenkins formed a co-partnership under the firm name of Jenkins Bros.

Their store was then located at 104 Sudbury Street, Boston, and it was there that Alfred B. Jenkins first commenced to sell valves. It was an uphill fight from the start, as the valves were a novelty to the trade, and it had to be demonstrated that the discs would successfully withstand steam. Having early decided that the valves should be of superior quality, and adopting a strong guarantee of satisfaction to the user, with the persistent efforts of Alfred B. Jenkins, who did most of the traveling and selling at that time, it was not long before the valves received the indorsement of users, and their sale increased.

On May 1, 1880, their first branch store was opened in New York; in 1885 a branch store was opened in Philadelphia; and in 1886 a branch was opened in Chicago.

The partnership existing between Charles and Alfred B. Jenkins was terminated in 1896, when Alfred B. Jenkins became sole owner of the business of Jenkins Bros.,

and continued to trade under the old-established name.

To take care of the Canadian business it was deemed advisable to have a factory in Canada, and in 1906 Jenkins Bros., Limited, was incorporated under the laws of the Dominion of Canada, and a modern factory erected in Montreal. A number of the employees of Jenkins Bros. were given the privilege of subscribing to the capital stock of the new company, and the balance retained by Alfred B. Jenkins.

In the year 1907, the business of Jenkins Bros. in the United States was incorporated under the same title. A portion of the stock was distributed among his employees, while Mr. Jenkins remained at the head as president, and so continued up to the time of his death.

He is survived by his widow and one daughter, Mrs. Farnham Yardley.

Death of Alfred E. Kenrick.

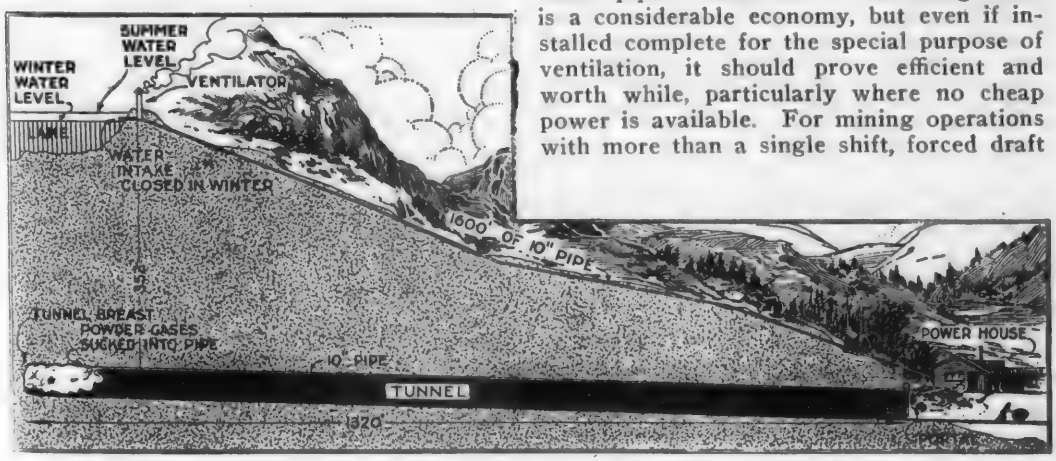
Alfred E. Kenrick, a former president of The American Society of Heating and Ventilating Engineers and of the National Association of Master Steam and Hot Water Fitters, died at his home in Brookline, Mass., January 17. Mr. Kenrick was 66 years old. His entire business career was spent in the heating and plumbing business; he was the sole survivor of the firm of Kenrick Bros., of Brookline. Mr. Kenrick had attended every annual convention of the national master fitters' association since its organization 27 years ago. On his "25th anniversary" in Chicago two years ago he was presented by the association with a silver testimonial, consisting of a silver pitcher and salver. For many years Mr. Kenrick was a director of the Brookline Savings Bank. He was one of the original stockholders of the Heating and Ventilating Magazine Company.

Ventilating a Mine Tunnel.

Excellent ventilation was provided in a mine during the winter seasons, with one shift working, by the installation of the pipe system shown in the sketch. During the summer water power is available from a lake 352 ft. above the tunnel, this fall operating a compressor and water wheel, a 10-in. fan providing air for use at the forge and in the mine. In the winter the water from the lake is not available, and this source of power is cut off until the melting of the snow raises the water in the lake basin.

To provide ventilation in winter, the 10-in. ventilation pipe is connected with the 10-in. water pipe, the water intake being closed. A standpipe with a ventilator head is provided at the lake end of the water pipe, as shown in the illustration. The air moves freely from the ventilator, being aided by the action of the wind, and the fact that the warm air at the tunnel breast will have a tendency to rise in the pipe. The pipe line from the power house to the lake is 1,600 ft., the tunnel is cut into the hillside 1,320 ft., and 100 ft. of pipe was required to connect the line from the portal of the tunnel to the lower end of the water pipe. After blasting down the rock, the powder fumes come from the ventilator quickly, and by morning, when the shift is ready to resume operations, the entire mine—2,400 ft. of workings, closed stopes, or chambers in which the rock is blasted from overhead, with manways, and 50 ft. of stoping—is clear of gas and thoroughly ventilated.

This ventilating system was inexpensive under the conditions, and is suggestive for adaptation in many other similar mining or tunneling operations. The fact that the water pipe is used for a ventilating shaft is a considerable economy, but even if installed complete for the special purpose of ventilation, it should prove efficient and worth while, particularly where no cheap power is available. For mining operations with more than a single shift, forced draft



NOVEL METHOD OF VENTILATING MINE.

would be necessary to provide adequate ventilation. The pipes should be run up to a sufficient height for proper draft, by the shortest route available.—*George N. Steuart, in Popular Mechanics.*

Sales Meeting of Warren Webster & Company.

Following the recent annual meeting of The American Society of Heating and Ventilating Engineers, in New York, which was attended by many branch managers and representatives of Warren Webster & Co., the annual sales meeting of the company's representatives was held at the Hotel Astor, New York, January 18. The keynote of the meeting was co-operation—with the professional engineer, with the architect, with the heating contractor and with the owners. Several papers on these topics were read and discussed.

1423 buildings were equipped with the Webster system in 1916.

The following branch managers and representatives were present, the figures in parenthesis indicating the year each became associated with Warren Webster & Co.:

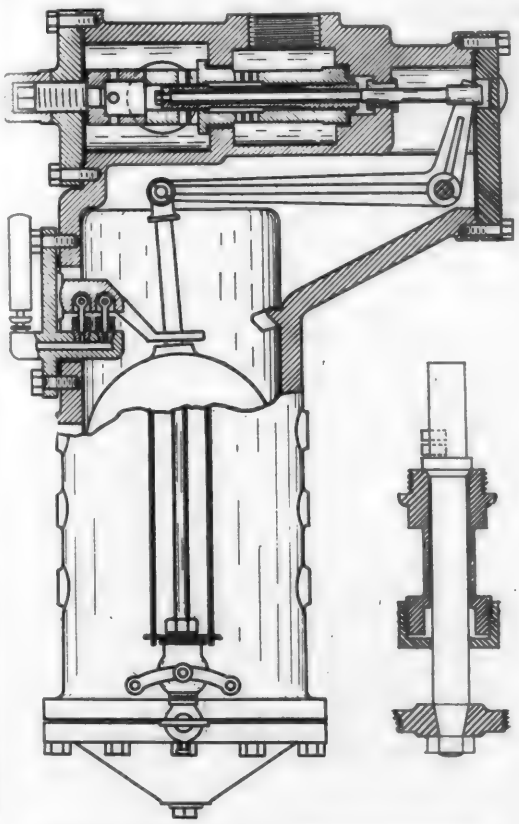
Warren Webster, president (1888); H. H. Fielding, Denver (1890); J. A. Robinson, Pittsburgh (1891); R. L. Claypool, Philadelphia (1892); J. A. Serrell, New York (1894); T. R. Schenck, New York (1895); W. C. Green, Cincinnati (1898); F. H. Stevens, assistant treasurer (1898); W. M. Treadwell, New York (1899); H. Newman, New York (1900); William H. Chenoweth, Jr., Chicago (1901); Theodore Weinshank, Indianapolis (1902); John B. Dobson, Atlanta (1902); E. K. Lanning, assistant secretary (1903); H. C. Beatty, manager engineering department (1903); R. G. Brown, New York (1903); F. G. Phegley, Cleveland (1904); F. H. Ross, Wilkes-Barre (1904); C. A. Kopf, New York (1904); William G. Snow, Boston (1905); J. L. Fitts, superintendent (1906); S. E. Fenstenmaker, Indianapolis (1906); L. C. Quackenboss, New York (1906); Benjamin Natkin, Kansas City (1908); George Eagan, Philadelphia (1908); George Westerfield, Houston (1909); E. K. Webster, secretary and assistant general manager (1910); W. F. Bilyeu, manager feed water department (1910); R. B. Stanger, Pittsburgh (1910); A. B. Knight, Detroit (1913); R. B. Beahm, Philadelphia (1914); R. T. Coe, Rochester (1915); S. B. Strouse, Atlantic City (1915); C. A. Heilman, Washington (1915); Arnold Webster, Camden (1916); E. P. Bradley, St. Louis (1916); John Jay,

SALES MEETING DINNER OF WARREN WEBSTER & COMPANY REPRESENTATIVES.

Camden (1916); Richard Dawson, Montreal, Can.; H. J. Church, Toronto, Can.; and C. Sargent, Winnipeg, Can.

Development of the Ray Continuous-Flow Feed-Water Regulator.

The accompanying illustration shows all the essential parts of a combined safety water-column and a continuous-flow feed-water regulator which has been gradually evolved by the Ray Mfg. Co., Louisville, Ky. The principle employed consists of a perfectly-balanced valve operated by a float, the feed water being admitted to the



DETAILS OF THE RAY CONTINUOUS-FLOW FEED-WATER REGULATOR.

valve on its center and discharged on one end. The water should pass through the valve in a continuous flow in exact ratio to the evaporation. The regulators are furnished in five sizes, ranging from 2-in. to 4-in.

The high and low alarm whistle is operated by the same float that operates the regulating valve by having two contact points on the float rod to engage the whistle lever. The whistle lever is counter-balanced so that it holds the whistle valve closed when pressure is off the boiler.

Several interesting mechanical improvements have recently been made in this regulator. These refer to the valve bushing, strainer and support. The bushing, which was originally pressed into the head is now made loose in head and held in place by a jack screw in the valve chamber head. This bushing seats in head on two gaskets, one at the end and the other on a shoulder to prevent the passing of water except through the ports in bushing and through valve. This construction allows the bushing to be easily removed. Also, the valve bushing now serves the double purpose of a cylinder for the valve to work in and as a strainer to prevent the foreign matter from entering the valve.

Another improvement is that each regulator is now equipped with a device so that the high and low water alarm whistle can be made to blow regardless of the height of water in the column or the work that the boiler is doing.

Notable Activity in the Vacuum Pump Line.

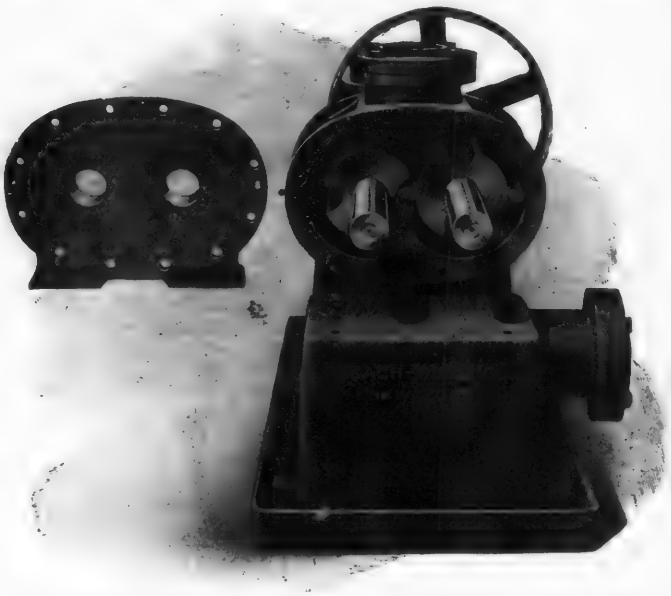
An indication of the increasing demand for vacuum pumps for use in heating work is furnished by the Beach-Russ Co., New York, which states that the sales of its special return line rotary valveless pumps have grown to such an extent that the company plant is now operating day and night. This company has been manufacturing pumps for 26 years, specializing on high-vacuum pumps, such as those used in electric lamp exhausting laboratories; also on pumps for air-line vacuum heating, etc. The company's return line vacuum heating pump, which is shown in the accompanying illustration, was brought out about six years ago. It is made without valves, cams, springs or leather, and has but two moving parts, the impellers. These impellers, however, have no contact so that there is neither friction or wear in their operation. They are separated by accurate-gauged clearance and are driven by wide-faced gears in the housing, with six ring oiling bearings lined with Babbitt metal. The pump is mounted on a heavy cast-iron drip-pan base. The gears, which have wide faces, run in oil, with dust-proof housing.

The clearances of impellers is automatically sealed with a small amount of water or condensation. In vacuum heating the condensation is found sufficient for this seal.

From tests made in actual operation, the company reports that these pumps have exhausted as high as 17 in. of vacuum, al-

though for vacuum heating 7 in. to 10 in. is all that is necessary.

Return line pumps, it is pointed out, should have air chambers on the suction and discharge sides. These are usually made from a piece of pipe one size larger than the openings in the pump, and the pipe should be 3 to 4 ft. high, with a cap on top of the pipe.



BEACH-RUSS RETURN LINE ROTARY VALVELESS VACUUM PUMP.

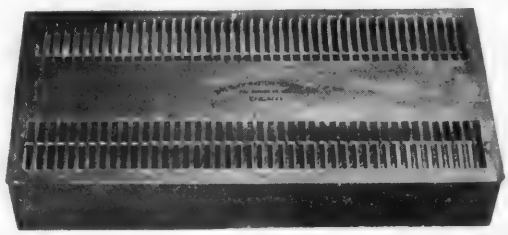
The company emphasizes the importance of making sure that the vacuum return line valves are tight against leakage of steam. Sometimes these valves collapse, in which case steam is pulled through the pump, killing the vacuum. If a return-line pump is not giving the desired amount of vacuum, the valves should be looked after and the ones that have collapsed should be replaced by new ones.

The Beach-Russ Company's engineering force, it is stated, is always available without cost for the study and solution of vacuum heating problems.

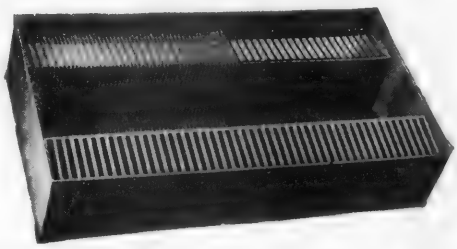
Trade Literature.

HUMIDITY AND TEMPERATURE REGULATING DEVICES is the title of a new bulletin (No. 102) in a remarkable series of engineering treatises which are being issued by the Carrier Engineering Corporation, New York. The new bulletin contains 48 pages of description and illustrations of controlling devices to meet all commercial requirements for air conditioning. The introductory pages explain how a system of control is dependent upon various factors, chief of which are the number and sizes of rooms, their contents, arrangement of machinery, source of heat and moisture, effect of air currents and the exact humidifying, dehumidifying, heating, cooling and drying or combination of these to be accomplished. A copy of this bulletin may be had free on application. Size 6 x 9 in. (standard). Pp. 48 (punched for binding).

BUDDINGTON HUMIDFIERS, designed to be placed on radiators and registers to add moisture to the air in heated rooms, are interesting devices described and illustrated in circular matter issued by the Reid-Geisler Mfg. Co., 336 West Madison St., Chicago. It is stated that with a hot radiator this humidifier will evaporate a gallon of water in 12 hrs. Perforated wings hold specially-woven wicks out from each side of the water container. One edge of each wick is in the water. The other is out on the wings through

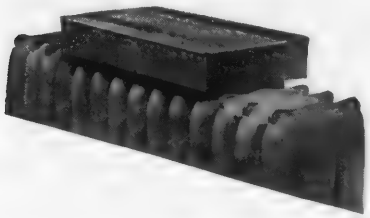


BUDDINGTON HUMIDIFIER WITH COVER.



BUDDINGTON HUMIDIFIER WITH COVER REMOVED.

which is drawn the warm air, thus aiding the evaporation. Capillary attraction draws water up through the wicks. The wicks are wet



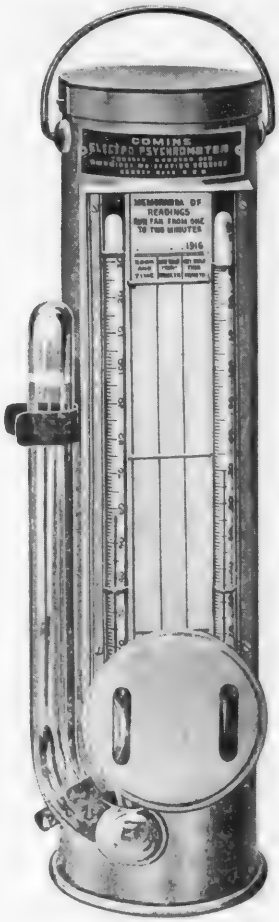
BUDDINGTON HUMIDIFIER INSTALLED ON RADIATOR.

on the wings as long as there is water in the container. The device is listed at $3.00.

TWENTY-EIGHT YEARS OF STEEL (NATIONAL) PIPE PROGRESS is presented graphically in a bulletin just published by the National Tube Co., Pittsburgh, Pa. A series of illustrations is included, showing similar progress in other lines of manufacture and thus indicating the tremendous advances in every line, but in none is the advance more spectacular than in the manufacture of steel pipe. Steel pipe was first made in 1887, the tonnage for that year being 300 tons. To-day, it is pointed out, steel pipe represents almost 90% of the total tonnage of screw-joint pipe made in this country, a substantial portion of which is "National" pipe. The full story of the rise of steel pipe, it is announced, is contained in "National" Bulletin No. 24, a copy of which may be had by addressing the National Tube Company.

COCHRANE HEATERS FOR STEAM POWER PLANTS, as used in heating, metering and softening water for boiler-feed and other purposes, are treated at length in a new publication (Catalogue No. 710), recently issued by the Harrison Safety Boiler Works, 3189 North 17th St., Philadelphia, Pa. The booklet is devoted especially to the uses of open heaters for the purposes stated. The amount of fuel that can be saved by the use of exhaust steam is first explained and a convenient diagram is given by which the percentages of fuel saving in any given case can be easily ascertained. The essential parts of an open feed-water heater are then considered, after which there are chapters on heating boiler feed in condensing steam power plants, including various arrangements to be used where the exhaust steam is excessive or deficient, the effects of open heaters in connection with exhaust steam heating and drying systems, the heating of water for purposes other than boiler feed, such as hot water heating, etc. Finally there is a detailed comparison of the open heater, as represented by the Cochrane feed-water heater, with the closed or pressure type of heater, concluding with suggestions for the specification of an open feed-water heater. Size 6 x 9 in. (standard). Pp. 100.

COMINS ELECTRIC PSYCHROMETER, for determining the humidity of the atmosphere, made by the American Moistening Co., Boston, Mass., is described and illustrated in its latest form in a new circular issued by the manufacturers. One of the important advantages mentioned in connection with this instrument is that if it can be used in crowded spaces among machinery



COMINS ELECTRIC PSYCHROMETER.

where the need of readings is often greatest. Only one or two minutes, it is stated, are required for correct readings at any point. No special experience is required to take accurate readings with this instrument beyond ordinary attention and it does not need any greater care than the stationary

hygrometer. In both cases the wick for the wet bulb must be kept in proper condition. The circular contains some suggestions for the care and preparation of the wet-bulb thermometer and there are also included some handy psychrometric tables. Size 3½ x 6 in. Pp. 16.

SIMS STEAM-TUBE STORAGE HEATERS, for laundries, hotels, hospitals, and apartment buildings is the title of the latest bulletin (L-4) issued by the Sims Co., Erie, Pa. Special attention is paid to installations requiring large quantities of hot water, with live or exhaust steam as the heating medium. The catalogue is notable for the omission of all superfluous matter, no argument being presented to convince the reader of the quality of the Sims products. It is stated, however, that all work is guaranteed. The catalogue gives the general specifications for this type of heater, which is known as the Sims B-H heater, and these are followed by a series of 18 tables covering a sufficiently wide range of sizes and capacities to meet closely any combination that may be called for. Full directions are given for using the tables, by which answers may be obtained to problems like the following: To heat 250 gal. per hour from 50° to 180° F., with steam at atmosphere, providing storage for 150 gal. Another example which may be answered by the tables is the following. To heat 5,000 gal. per hour from 50° to 180° F., with steam at 50 lbs. pressure, storage 1,500 gal. The concluding pages are devoted to illustrations, with tables of connections, of the Sims B-H heater of different types. Size 6 x 9 in. (standard). Pp. 32.

METAPHRAM DAMPER REGULATORS, for high pressure, low pressure, hot water and vapor, embracing the complete line of these devices, are presented in new circular matter issued by the National Regulator Co., Chicago, Ill. The line embraces five types: Type H-P 7-in. for high pressure; Type A-Jr. 4-in., for low pressure; Type A 4-in., also for low pressure; Type B-C 7-in., for low pressure or vapor; and Type D 10-in., for vapor. These regulators are all metal, dust proof, and sensitive. They are guaranteed for the life of the boiler. The universal adjustment feature makes them applicable for pressure or vapor by changing the fulcrum position and shifting the weights and lever. They are made to fit any style of low pressure boiler and to work on ounces from 0 to 15 lbs. pressure, and on hot water at 5° change in temperature. The high pressure type is designed to operate on boiler pressures from 15 to 175 lbs.

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THE HEATING AND VENTILATING MAGAZINE — 1123 BROADWAY — N.Y. CITY.

B. T. U. Losses for Various Types of Construction

In the computation of heating requirements for buildings the first requisite is to ascertain the maximum probable heat loss per hour under extreme weather conditions. To a great extent the finer graduations in such calculations may be safely avoided, but for those who may desire to be absolutely correct the following tables have been prepared giving the heat loss co-efficient for 1 sq. ft. per degree F. per hour and also the calculating factors for a temperature difference from 35° to 80° F. for each co-efficient. The figures given in the tables are based on the practice of the German government, the United States government, as well as on the practice of several well-known American Engineers.

In the modern building refinements of the wall factor are not usually of great moment, owing to the larger proportion of glass surface now being used and the relatively greater heat loss of the glass. Therefore, care in computing the window and door areas, the window factor, and the allowance for exposure and leakage are the more essential items.

It is often the case, however, where combinations of construction are encountered, either in materials or in the combined thicknesses, that even approximate factors are not available; in such cases the factor may be developed if the factor is known of each of the two materials in the thicknesses used. The combined resistance of the two is then the sum of the resistances of each and the resistance is the reciprocal of the transmission factor.

Thus, if 20-in. brick transmits 16 B.T.U. at 70° F. difference, its resistance is 1/16. And if 12-in. stone at 70° F. difference transmits 35 B.T.U., its resistance is 1/35. The two combined into a wall will have a combined resistance of 1/16 plus 1/35, or 51/560 and the transmission factor is the reciprocal of the resistance or 11 B.T.U. per hour.

With glass and skylight it is desirable to consider single thickness in all cases, owing to the fact that the single thickness may be substituted by the building contractor without the knowledge of the owner, or it may be substituted by the owner to save cost, or, even if double thick be installed at first, it may in time become broken and be replaced with single-thickness glass.

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for regulating dampers in hot and cold air ducts, smoke pipes, etc.

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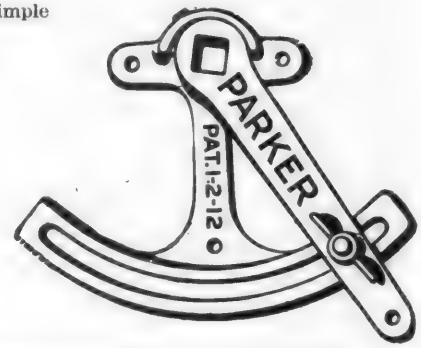

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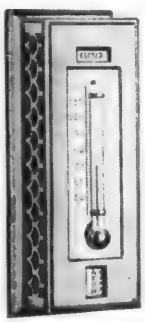

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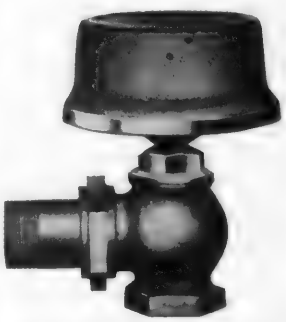

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Communicate with our nearest branch in regard to your temperature regulation requirements Our co-operation is yours for the asking. You can reach us overnight.

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MILWAUKEE, WIS.

HEAT LOSS CO-EFFICIENTS (CE).

(B.T.U. loss per square foot, per degree F., per hour.)

Brick Wall Thickness in inches Plain.	CE	Temperature Difference, Deg. F. 35	40	45	50	55	60	65	70	75	80
4	0.68	23.8	27.2	30.6	34.0	37.4	40.8	44.2	47.6	51.0	54.4
8	0.40	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0	32.0
12	0.31	10.8	12.4	13.9	15.5	17.0	18.6	20.1	21.7	23.2	24.8
16	0.26	9.1	10.4	11.7	13.0	14.3	15.6	16.9	18.2	19.5	20.8
20	0.23	8.0	9.2	10.3	11.5	12.6	13.8	14.9	16.1	17.2	18.4
24	0.20	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0
28	0.18	6.3	7.2	8.1	9.0	9.9	10.8	11.7	12.6	13.5	14.4
32	0.16	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	12.8
36	0.12	4.2	4.8	5.4	6.0	6.6	7.2	7.8	8.4	9.0	9.6
Plastered Inside.											
4	0.70	24.5	28.0	31.5	35.0	38.5	42.0	45.5	49.0	52.5	56.0
8	0.42	14.7	16.8	18.9	21.0	23.1	25.2	27.3	29.4	31.5	33.6
12	0.33	11.5	13.2	14.8	16.5	18.1	19.8	21.4	23.1	24.7	26.4
16	0.25	8.7	10.0	11.2	12.5	13.7	15.0	16.2	17.5	18.7	20.0
20	0.23	8.0	9.2	10.3	11.5	12.6	13.8	14.9	16.1	17.2	18.4
24	0.21	7.3	8.4	9.4	10.5	11.5	12.6	13.6	14.7	15.7	16.8
28	0.19	6.6	7.6	8.5	9.5	10.4	11.4	12.3	13.3	14.2	15.2
32	0.17	5.9	6.8	7.6	8.5	9.3	10.2	11.0	11.9	12.7	13.6
36	0.13	4.5	5.2	5.8	7.1	7.8	8.4	9.1	9.7	10.5	11.2
One Side Furred and Plastered.											
4	0.56	19.6	22.4	25.2	28.0	30.8	33.6	36.4	39.2	42.0	44.8
8	0.30	10.5	12.0	13.5	15.0	16.5	18.0	19.5	21.0	22.5	24.0
12	0.23	8.0	9.2	10.3	11.5	12.6	13.8	14.9	16.1	17.2	18.4
16	0.20	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0
20	0.18	6.3	7.2	8.1	9.0	9.9	10.8	11.7	12.6	13.5	14.4
24	0.16	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	12.8
28	0.14	4.9	5.6	6.3	7.0	7.7	8.4	9.1	9.8	10.5	11.2
32	0.12	4.2	4.8	5.4	6.0	6.6	7.2	7.8	8.4	9.0	9.6
Plastered Two Sides											
4	0.43	15.0	17.2	19.3	21.5	23.6	25.8	27.9	30.1	32.5	34.4
8	0.33	11.5	13.2	14.8	16.5	18.1	19.8	21.4	23.1	24.7	26.4
12	0.26	9.1	10.4	11.7	13.0	14.3	15.6	16.9	18.2	19.5	20.8

NOTE—For brick and sandstone see "Combinations" Sheet No. 1-C.

Copies of this sheet, printed separately; 5 cents each.

Announcement

Braemer Air Conditioning Corporation

takes pleasure in announcing that it has taken over the business and good will of the Air Conditioning Department of Warren Webster & Company, Camden, N. J., and will continue the manufacture of Webster Air Conditioning apparatus and Webster Air Washers, specializing in

Air Purifying—Cooling—High Temperature Drying—Special Ventilating Systems for Industrial Plants—Humidifying—Dehumidifying—Low Temperature Drying—Automatic Humidity and Temperature Regulation

It will be the policy of the Braemer Air Conditioning Corporation to maintain the same high grade apparatus and engineering service as has been rendered by the Air Conditioning Department of Warren Webster and Company for the past nine years. Your inquiries are earnestly solicited and will be given prompt and careful attention.

Braemer Air Conditioning Corporation

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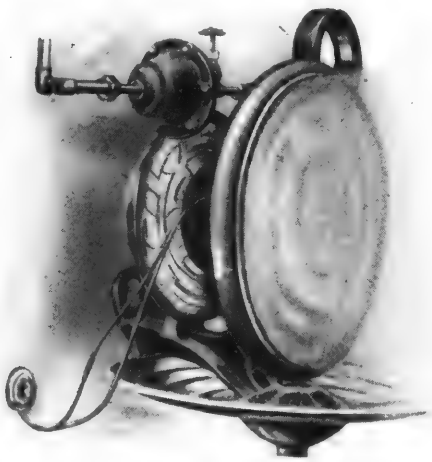

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HEAT LOSS CO-EFFICIENTS (CE).

(B.T.U. Loss per square foot, per degree F., per hour.)

Stone Wall Thickness in Inches. Limestone, Plain.											
12	0.49	17.1	19.6	22.0	24.5	26.9	29.4	31.8	34.3	36.7	39.2
16	0.46	16.1	18.4	20.7	23.0	25.3	27.6	29.9	32.2	34.5	36.8
20	0.41	14.3	16.4	18.4	20.5	22.5	24.6	26.6	28.7	30.7	32.8
24	0.37	12.9	14.8	16.6	18.5	20.3	22.2	24.0	25.9	27.7	29.6
28	0.33	11.5	13.2	14.8	16.5	18.1	19.8	21.4	23.1	24.7	26.4
32	0.29	10.1	11.6	13.0	14.5	15.9	17.4	18.8	20.3	21.7	23.2
Sand Stone, Plain.											
12	0.50	17.5	20.0	22.5	25.0	27.5	30.0	32.5	35.0	37.5	40.0
16	0.45	15.7	18.0	20.2	22.5	24.7	27.0	29.2	31.5	33.7	36.0
20	0.40	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0	32.0
24	0.36	12.6	14.4	16.2	18.0	19.8	21.6	23.4	25.2	27.0	28.8
28	0.32	11.2	12.8	14.4	16.0	17.6	19.2	20.8	22.4	24.0	25.6
32	0.28	9.8	11.2	12.6	14.0	15.4	16.8	18.2	19.6	21.0	22.4

NOTE—Some authorities use losses for stone of 60% more than brick.

Concrete Wall Plain											
4	1.07	37.4	42.8	48.1	53.5	58.8	64.2	69.5	74.9	80.2	85.6
6	0.70	24.5	28.0	31.5	35.0	38.5	42.0	45.5	49.0	52.5	56.0
8	0.51	17.8	20.4	22.9	25.5	28.0	30.6	33.1	35.7	38.2	40.8
12	0.43	15.0	17.2	19.3	21.5	23.6	25.8	27.9	30.1	32.5	34.4
16	0.36	12.6	14.4	16.2	18.0	19.8	21.6	23.4	25.2	27.0	28.8

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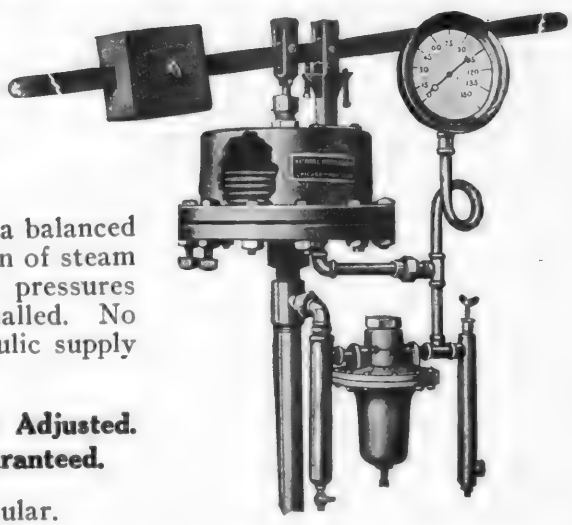

which will automatically operate a balanced draft damper on a slight variation of steam pressure. Designed for boiler pressures from 15 to 175 lbs. Easily installed. No auxiliary mechanism. No hydraulic supply or waste lines.

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CONCRETE AND SANDSTONE WALL Thickness in Inches. Plain.											
12	0.45	15.7	18.0	20.2	22.5	24.7	27.0	29.2	31.5	33.7	36.0
16	0.39	13.6	15.6	17.5	19.5	21.4	23.4	25.3	27.3	29.2	31.2
20	0.35	12.2	14.0	15.7	17.5	19.2	21.0	22.7	24.5	26.2	28.0
24	0.31	10.8	12.4	13.9	15.5	17.0	18.6	20.1	21.7	23.2	24.8
28	0.28	9.8	11.2	12.6	14.0	15.4	16.8	18.2	19.6	21.0	22.4
32	0.26	9.1	10.4	11.7	13.0	14.3	15.6	16.9	18.2	19.5	20.8
BRICK AND SANDSTONE WALL											
4-in. Br. and 4-in. Ss.	0.31	10.8	12.4	13.9	15.5	17.0	18.6	20.1	21.7	23.2	24.8
4-in. Br. and 8-in, Ss.	0.29	10.1	11.6	13.0	14.5	15.9	17.4	18.8	20.3	21.7	23.2
4-in. Br. and 12-in. Ss.	0.26	9.1	10.4	11.7	13.0	14.3	15.6	16.9	18.2	19.5	20.8
8-in. Br. and 4-in. Ss.	0.22	7.7	8.8	9.9	11.0	12.1	13.2	14.3	15.4	16.5	17.6
8-in. Br. and 8-in. Ss.	0.20	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0
8-in. Br. and 12-in. Ss.	0.19	6.6	7.6	8.5	9.5	10.4	11.4	12.3	13.3	14.2	15.2
12-in. Br. and 4-in. Ss.	0.17	5.9	6.8	7.6	8.5	9.3	10.2	11.0	11.9	12.7	13.6
12-in. Br. and 8-in. Ss.	0.16	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	12.8
12-in. Br. and 12-in. Ss.	0.15	5.2	6.0	6.7	7.5	8.2	9.0	9.7	10.5	11.2	12.0
16-in. Br. and 4-in. Ss.	0.21	7.3	8.4	9.4	10.5	11.5	12.6	13.6	14.7	15.7	16.8
16-in. Br. and 8-in. Ss.	0.20	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0
16-in. Br. and 12-in. Ss.	0.19	6.6	7.6	8.5	9.5	10.4	11.4	12.3	13.3	14.2	15.2
20-in. Br. and 4-in. Ss.	0.20	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0
20-in. Br. and 8-in. Ss.	0.19	6.6	7.6	8.5	9.5	10.4	11.4	12.3	13.3	14.2	15.2
20-in. Br. and 12-in. Ss.	0.17	5.9	6.8	7.6	8.5	9.3	10.2	11.0	11.9	12.7	13.6
24-in. Br. and 4-in. Ss.	0.17	5.9	6.8	7.6	8.5	9.3	10.2	11.0	11.9	12.7	13.6
24-in. Br. and 8-in. Ss.	0.16	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	12.8
24-in. Br. and 12-in. Ss.	0.14	4.9	5.6	6.3	7.0	7.7	8.4	9.1	9.8	10.5	11.2
28-in. Br. and 4-in. Ss.	0.16	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	12.8
28-in. Br. and 8-in. Ss.	0.14	4.9	5.6	6.3	7.0	7.7	8.4	9.1	9.8	10.5	11.2
28-in. Br. and 12-in. Ss.	0.13	4.5	5.2	5.8	6.5	7.1	7.8	8.4	9.1	9.7	10.4

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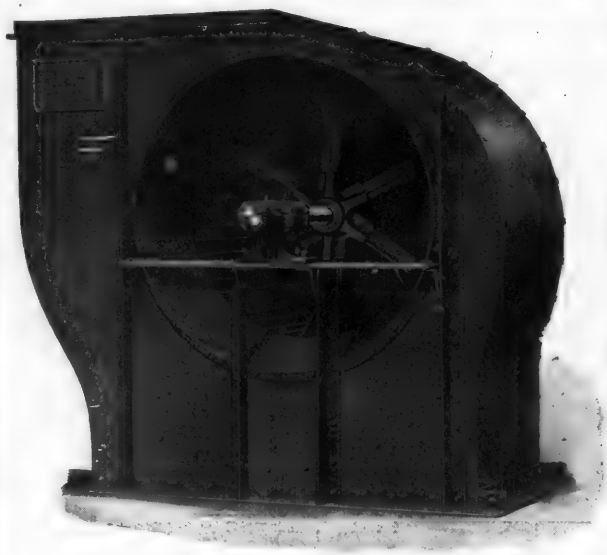

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TRADE AND MISCELLANEOUS NOTES

Coming Events.

May 21-24, 1917.—Spring meeting of The American Society of Mechanical Engineers, in Cincinnati, O. .

June 12-15, 1917.—Ninth annual convention of the National District Heating Association, in Detroit, Mich. Headquarters at the Hotel Pontchartrain. Secretary, D. L. Gaskill, Greenville, O. .

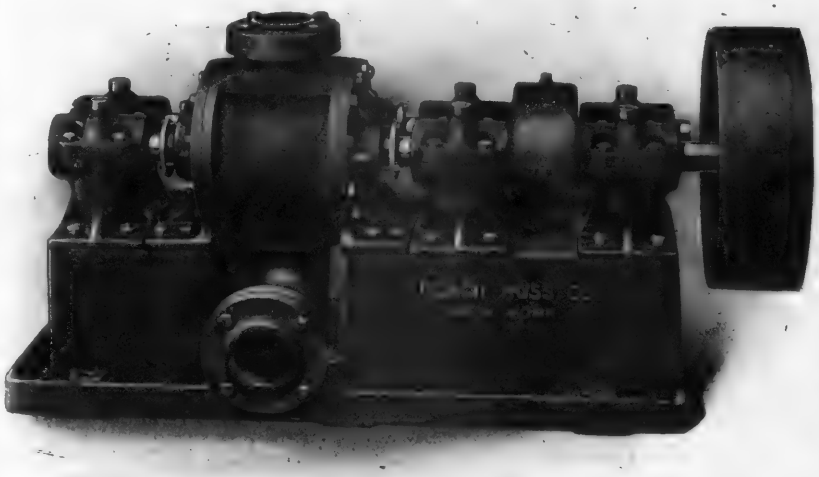
Deaths.

George H. Zellers, Washington, D. C., a well-known heating contractor of that city, and for many years prominently identified with the National Association of Master Steam and Hot Water Fitters, died at his home in Washington, December 15. He was sixty-four years old. As sergeant-at-arms of the master fitters' association, Mr. Zellers came to be widely known in the heating trade, while his long-continued and faithful services to the association displayed a warm devotion to the cause. He was elected a director of the association in 1905, serving until 1909. Although born in Germany Mr. Zellers had spent practically all of his life in this country. He had been engaged in the heating contracting business in Washington for twenty-six years. He leaves a widow, four daughters and two sons.

Samuel W. Barnes, Philadelphia, Pa., one of the early heating and plumbing contractors of Philadelphia, died at his home in that city December 14, at the age of seventy-five years. His son, S. Louis

The Vacuum Pump Engineers Specify

There's a Reason



THE

Beach-Russ Rotary Pump

has no valves and gives best results for vacuum heating systems.

Profit by our 26 years' experience as builders of HIGH-GRADE PUMPS.

Beach-Russ Company was awarded Gold Medal at the Panama-Pacific Exposition.

Write for Bulletin No. 20

Phones Cortlandt 54 55 56

BEACH-RUSS CO., 220 Broadway, New York

Barnes, was a recent president of the National Association of Master Plumbers.

William Zeller, head of the firm of William Zeller & Co., Baltimore, Md., manufacturers of architectural sheet metal, died at his home in that city, December 14.

James Maclay, one of the founders of McNab & Harlin Mfg. Co., New York, manufacturers of steam fitting supplies, died January 4 in Paterson, N. J., where the company's plant is located. He was 82 years old. Mr. Maclay was the last of the original members of the company.

Miscellaneous Notes.

National Conference Board of Manufacturers of Plumbing and Heating Goods is the name of a new organization which will be formed as the result of a meeting held in New York, December 15. This meeting was called on the recommendation of the National Association of Brass Manufacturers, urging the formation of such an organization. The new conference board, which will act as a clearing house for the transmission of such matters as may be referred to it, will be made up of the commissioners and secretaries of the various associations interested. It is planned to hold a meeting to effect permanent organization of the board in Cleveland or Pittsburgh at an early date.

Cleveland, O.—Officers elected at the annual meeting of the Master Steam and Hot Water Fitters' Association of Cleveland, which was held in that city, December 18, are as follows: President, William Chafer, Chafer Co.; vice-president, Edward Maurer, Maurer Bros. Co.; secretary, W. B. Van Sickle; treasurer, A. E. Welker, Price-Welker Co. Executive committee: above-named officers and M. L. Crowell, Crowell-Smith Co.; Willard Clark, Warden & Leese; E. Credicott, Walter Klie, both of Smith & Oby Co.; and William Warren, Chappell-Warren Co. Seventy-six diners were present at the dinner at the Hofbrau Restaurant, which followed the meeting. After speeches by the newly-elected officers and others, a unique entertainment was presented in costume. The first number was entitled, "Where Are My Children?" and this was followed by "The Judgment of King Solomon," in which the principal parts were taken by Edward Maurer, Arthur Welker, M. L. Jones, Walter Klie and William C. Clark.

Salem, Ore.—A recommendation to the State legislature is made by Labor Commis-

Reduced Heating Costs

are assured if your clients use a

"RELIABLE" VACUUM OR VACU-VAPOR HEATING SYSTEM

With ordinary steam plants a great deal of coal is burned to create the steam pressure which is necessary to force cold air out of the radiators and piping. If, however, a "Reliable" System is used in connection, the Vacuum Pump creates and automatically maintains a vacuum in the system. Steam is generated at less than 212 degrees Fahrenheit, and is pulled into all the radiators; and our automatic radiator valves insure all the steam being utilized for heating. These are reasons why "Reliable" Systems reduce fuel bills, and the saving is a big item now that coal is so high in price.

The "Reliable" Trio—Air Line, Return Line and Vacu-Vapor—cover every requirement, and are equally efficient for large or small steam plants in any style of building. Specify them and your clients will be more than pleased.

The new "Reliable" Heating Catalog "H V" contains some valuable information and data. Send for your copy, now—it will prove of interest.

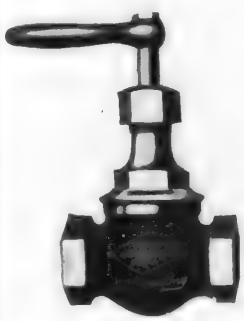
THE BISHOP-BABCOCK-BECKER CO. Cleveland, O.

sioner Hoff that a mining inspector be appointed to see that the mines are operated in a proper manner, and that adequate working devices, sufficient ventilation and a proper pure air supply are installed and maintained. The recommendations are the result of a number of recent mine accidents in Oregon.

Chicago, Ill.—In the proposed extension of Chicago's subway system, it was brought out that Chicago's opportunity to obtain the desired extension depends almost entirely on consolidating the elevated and surface lines and operating the subway in conjunction with existing traction facilities. In this connection the important question of ventilation has been brought up, the statement being made by Walter L. Fisher, who was instrumental in drafting the 1907 traction ordinance, that "if the service is the same, I would rather ride in sunshine and fresh air than in a hole in the ground. Ventilation in a subway cannot be perfect." It was intimated that the subway project would depend largely on the adequacy of the ventilation plans.

New York.—A survey made by the New York City Health Department of the working conditions of clerks, stenographers and bookkeepers, and covering the financial district of that city, produced some interesting statistics. A record was made of the width of the streets, height of buildings, dark rooms, illumination, ventilation, and sanitary provisions. It was found in one block that there were 2,382 employees in 928 rooms. The average number of visitors a day was 16,097. Eighty-five per cent of the employees were found to be working by artificial light. The rooms were usually overcrowded, only 7% of the workers having over 200 sq. ft. of floor space, while 26% had under 50 sq. ft. Eighteen and six-tenths per cent of the workers had less than 500 cu. ft. of air space, and 49.32% had over 1,000 cu. ft. It was found that forced ventilation was used generally on the basement and first floors only. In four buildings forced ventilation extended as high as the second floor. The general conclusion was that the ventilation throughout this block was unsatisfactory. Although there were plenty of strong air currents, due to the tall buildings in the neighborhood, the windows could not be kept open on account of the strong drafts. Inside openings, such as transoms, existed only in a few instances. Where mechanical ventilators of the individual type, run by electricity, were installed, satisfactory results were secured, especially where the incoming air was heated. Indoor temperatures were often found too high and the relative humidity was almost invariably too low, ranging from 21% to 43%.

Washington, D. C.—According to a bulletin issued by the Bureau of Mines, coke is the coming fuel for heating residences. One reason for this statement is that so many by-products of coke are now being used in making dyes, explosives and medicines, that larger quantities of it are being put on the market. At present, it is stated,



Jenkins Bros. Valves for Quick Service

Are you in need of valves where saving of time in opening and closing is desirable? The Jenkins Bros. Quick Opening Globe and Angle Valves have been especially designed for this purpose. The spindles and bonnets are quadruple threaded, with a thread of coarse pitch, which enables the valves to be opened full with only about one-quarter the usual number of turns. There's a Jenkins Bros. Valve for every purpose—consult catalogue No. 20.

Jenkins Bros.

New York Boston Philadelphia Chicago Montreal London

SPECIFY — FOXBORO — INSTRUMENTS

TRADE MARK

TO INDICATE or RECORD TEMPERATURES and PRESSURE

They have a distinctive quality with a fineness of mechanical detail which insures Accuracy and Durability under the hardest Service

THE FOXBORO COMPANY, FOXBORO, MASS.

New York Chicago St. Louis Birmingham, Ala. San Francisco

Please mention THE HEATING AND VENTILATING MAGAZINE *when you write.*

coke would probably cost more than soft coal and less than anthracite. To burn coke in a heating furnace, it is pointed out, the furnace should have a deep firebox, at least 18 in. and preferably more.

Chicago, Ill.—It is reported that in the Indiana end of the Calumet steel belt, including Gary, Whiting, East Chicago, Indiana Harbor, Valparaiso, Hobart and Miller, $50,000,000 is being expended in outlays for new mills and furnaces and that industries scheduled to come and extensions to be made call for another $100,000,000, the aggregate far exceeding the original Gary project. As soon as men can be had and the structural steel fabricated, work will be started on the first unit of the Gary Tube Company, an offspring of the National Tube Company. This plant will cost $25,000,000, and will contain a Bessemer steel plant, two 40-in. blooming mills, four skelp mills, universal and shearing mills, pipe shops, etc. It is also stated that $7,000,000 has been invested in new residences, apartment buildings and business blocks in the Indiana towns named and that, in spite of this, there has been a pronounced shortage of living accommodations because of the rapidly-increasing population.

Indianapolis, Ind.—Indictments against Fred W. GrosClaude, of Indianapolis, representing the American Heating and Ventilating Company, accused of presenting a false claim against Nevins township in connection with a heating system for the high school at Fontanet, have been nolled in the Circuit Court. Affidavits were presented from Charles Padgett, contractor, and the Model Sheet Metal Company, showing that the claim presented, on which the indictments were returned, was just.

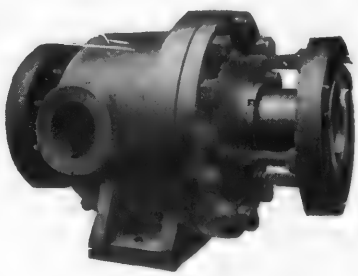
Sioux City, Ia.—A proposed ordinance has been introduced in the city council of Sioux City providing for a boiler inspector. It is not planned to add a new man to the city pay roll, but to place additional duties on the smoke inspector.

Pittsburgh, Pa.—William Coach and thirty-two other members of the National Association of Master Plumbers, who were indicted under the Sherman anti-trust law, will be allowed to plead nollo contendere, according to an opinion handed own by Juge Charles P. Orr, in the United States District Court. The indictments charged that the defendants entered into a combination to secure a monopoly of selling and installing plumbing equipment.

New York.—The New York Board of Health has adopted seven amendments to the sanitary code which bring it within the province of the health commissioner to prosecute in the criminal courts traction

"Alberger" High Pressure Expansion Joints

Sectional View



Exterior View

The elastic element in this joint is composed of chrome vanadium steel stampings welded at their edges, giving a construction suitable for continuous service, with varying steam temperature and which offers long life.

Send for Bulletin

No Packing **No Leakage**

ALBERGER PUMP AND CONDENSER CO.

140 CEDAR STREET, NEW YORK

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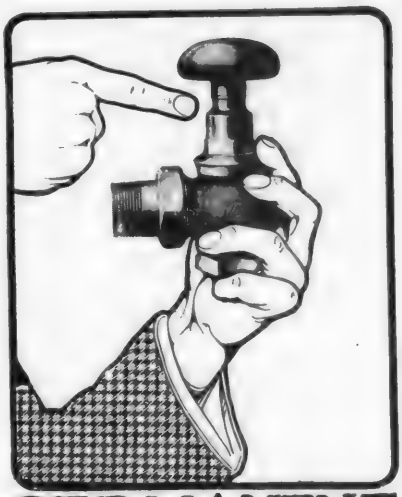
DETROIT PACKLESS RADIATOR VALVES



PERMANENT
· NICKEL ·
TRIMMINGS

Detroit Packless Valve trimmings are nickeled before being assembled. The plate is extra heavy, and by a special process is made as permanent as the valve itself.

No other valve is so handsomely plated or has such lasting lustre.

Specify Genuine Detroit Packless Valves

DETROIT LUBRICATOR COMPANY
DETROIT, U. S. A.
CANADIAN DETROIT LUBRICATOR COMPANY, LTD. WALKERVILLE, ONTARIO.

LARGEST MANUFACTURERS OF RADIATOR VALVES IN THE WORLD

companies which overcrowd their cars unnecessarily or provide unclean, unventilated, inadequately lighted or underheated conveyances. The amendments took effect immediately. For the immediate future, it is stated, the enforcement of the order regarding the heating and ventilating of cars will occupy the attention of the commissioner. Numerous complaints of underheating of the cars have been made recently. Commissioner Emerson has come out for some form of mechanical ventilating system to provide for the necessary air supply when the cars are crowded and when they are at a standstill.

Detroit, Mich.—Active opposition to the recommendations of Health Officer Price for more stringent regulation of the heating, ventilating and sanitation of moving picture theatres, has developed on the part of the theatre proprietors, who object to some of the provisions recommended. As a result of their opposition the matter was postponed at a recent meeting of the common council. Health Officer Price asks that the health department be given a voice in the licensing of moving picture theatres. Although the board of health now has the power to compel adequate ventilation, it is claimed that the present procedure in-

DANIEL S. WHITE PRESIDENT
JOSEPH W. MOTT MANAGER

HOTEL TRAYMORE
ATLANTIC CITY, N.J.

November 28, 1916.

Ilg Electric Ventilator Company,
327 Commercial Trust Building,
Philadelphia, Pennsylvania. Attention of Mr. C. A. Anderson.

Dear Sir:

In reply to yours of November 24th, concerning service which we have received from Ilg fans, beg to state that we have several of them in operation, all direct connected motor driven, and that they are giving perfect satisfaction. We wish to take this opportunity of expressing our appreciation of the well built commutators of your armatures, as we have fans that have been in operation about sixteen months and the commutators are practically unworn. When we compare these with other motors of first-class make on which we have turned down the commutators once or twice in the same period of time, it makes us feel that there must be particularly good material and workmanship in your product.

Yours very truly,

GBC/MK.

HOTEL TRAYMORE,
SUPT. OF PROPERTIES.

SEE WHAT THE
LARGEST RESORT HOTEL IN THE WORLD
SAYS ABOUT

ILG Universal Blowers and ILG Self-cooled Motor Propeller Fans

This installation includes 6 direct connected Universal Blowers, sizes 45″ to 90″, and 10 Self-cooled Motor Propeller Fans.

ILG ELECTRIC VENTILATING CO., 158 Whiting St., Chicago

William Penn Hotel, Pittsburgh, Pa.

Architects—Janssen & Abbolt *Engineer—C. R. Place*
Heating and Ventilating Contractors—F. E. Geisler & Company

Sturtevant
(REG. U. S. PAT. OFF.)

Apparatus

In the William Penn Hotel

In this issue of the Heating and Ventilating Magazine there is a descriptive article on the Heating and Ventilating system in the William Penn Hotel.

The equipment includes 23 Sturtevant Multivane Fans.

Write on your letterhead for catalogue 230-V regarding Sturtevant Heaters.

B. F. STURTEVANT COMPANY
HYDE PARK, BOSTON MASSACHUSETTS
And all Principal Cities of the World

Stationary Vacuum Cleaners, Air Washers, Fans, Heaters, Motors

volves court delays and much red tape.

Marshalltown, Ia.—According to a decision handed down by the Supreme Court of Iowa, the Wrot Iron Heater Company, of Des Moines, is enjoined from manufacturing or selling a furnace which is a duplication or simulation of the Lennox Furnace Company's Torrid Zone furnace. The Polk County District Court had previously issued a restraining order granting a temporary injunction, this ruling being now sustained by the higher court.

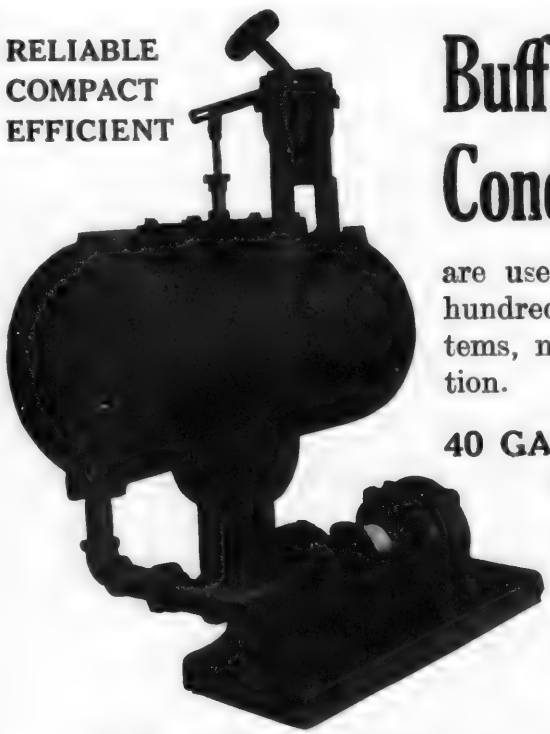
Cincinnati, O.—Poor ventilation in the "trailers," operated by the Cincinnati Traction Company, has resulted in a recommendation by Health Officer Landis that the size of the electric fans drawing the fresh air from the outside over a heated surface and distributing it through the interior of the car, be increased and the foul air outlets be enlarged. Vice-president Walter A. Draper, of the traction company, has agreed, it is stated, to carry out the recommendations. It has been found that the natural force of ventilation does not exert much influence in the "trailer" type of car.

Pittsburgh, Pa.—Due partly to the coal famine in Pittsburgh, a number of steel manufacturers have been conducting experiments with coal dust and have found that the dust can be successfully substituted for gas. The fuel, although not as cheap as natural gas, is being furnished to manufacturing plants in the Pittsburgh district, considerably cheaper than consumers' gas. The Carnegie Steel Company has installed coal-dust fuel machinery at twenty-four of its sixty-four open-hearth furnaces in its sixteen open-hearth furnaces at Clairton. By this action, the company will save 21,000,000 cu. ft. of natural gas daily. Other companies which have recently installed coal-dust fuel machinery are the National Malleable Casting Co. and the Sharon Hoop Co.

National Warm Air Heating and Ventilating Association held a special meeting in Cleveland, O., January 24, at the Hollenden Hotel, on the call of President John D. Green. Among the important matters up for consideration were the reports of J. M. McHenry, chairman of the committee on code for furnace installation. Other matters were the report of the advertising committee, uniform contract for installation, pipeless furnaces, and uniform guarantees.

L. O. Koven, who recently retired from the presidency of the Eastern Supply Association, was presented with a set of six silver plates and tray, December 21, by a

RELIABLE
COMPACT
EFFICIENT



No Steel Tank to Rust Out

Buffalo Automatic Condensation Pumps

are used to handle returns to boilers in hundreds of low pressure heating systems, materially reducing fuel consumption.

**40 GALLON CAST IRON RECEIVER
BRASS FITTED PUMP**

Specify amount of condensation, boiler pressure and details of electric current in your inquiry.

Buffalo Steam Pump Co.
Buffalo, N. Y.

Tank Showing Strainer with one Screen Raised and one Cover Open. Structural Frame at Right is for Supporting Eliminator Plates

Sturtevant
(REG. U.S. PAT. OFF.)

AirWashers

are designed with infinite care in every single detail. Some of the most fundamental mechanical advantages are as follows:

Strainer area more than twice that of any other washer made and ten times the area of some.

Strainer designed for easy removal for cleaning. No bolts, clamps or latches to be manipulated or to give trouble.

More nozzles per thousand cubic feet of air than any other washer.

Trap in overflow.

Supplies more water to eliminator plates for auxiliary washing than any other apparatus.

Furnished with louver diffuser plates on inlet side.

Send for Bulletin 226-V or Copy of Specifications

B. F. STURTEVANT COMPANY

HYDE PARK, BOSTON, MASSACHUSETTS

And All Principal Cities of the World

Stationary Vacuum Cleaners, Air Washers, Fans, Heaters, Motors

committee appointed for the purpose at the last meeting of the Eastern Supply Association. The committee consisted of P. M. Beecher, chairman; John A. Murray, Henry Stein and Secretary Frank S. Hanley. After the presentation, which was made by Mr. Beecher at Mr. Koven's home in Weehawken, the party was entertained by Mr. and Mrs. Koven.

Milwaukee Home and Real Estate Show will be held April 9-15, 1917, at the Milwaukee Auditorium. The show is being conducted by the Milwaukee Real Estate Association and is the first one of its kind to be held by this association. It is designed as "an exposition of the highest art of home building and planning," and will include exhibits of heating and ventilating apparatus for the home.

National Complete Building Exposition, which will be held in the Grand Central Palace, New York, March 5-11, 1917, is being planned as by far the most ambitious demonstration of up-to-date building, equipment and furnishing ever attempted in the United States. There will be separate displays of theatre, church and school building equipment. It is expected that at least two floors of the Grand Central Palace will be utilized for the show.

Allen-Scales Engineering Co., Nashville, Tenn., heating and ventilating engineers, have completed the establishment of its new quarters at 209 Church Street. By this change the offices and shops of the company are brought together and the company's accommodations greatly improved.

Central Station Heating Notes.

Des Moines, Ia.—In a recent issue of the *Des Moines Capital,* the project to revive the matter of a central station heating franchise is endorsed. "Ignorance and misunderstanding," it states, "caused the defeat of the heating franchise the last time it was submitted. This should not be allowed to stand in the way again."

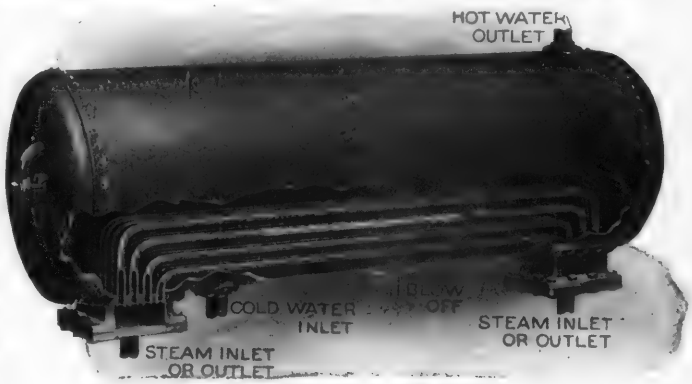
Springfield, O.—Important additions to be made to the plant of the Springfield Light, Heat & Power Co., in the spring, include the following, according to General Manager Weare Parsons: The coal-storing capacity at the plant will be increased from 1,500 to 6,000 tons. The daily consumption is about 150 tons. An addition 60 x 75 ft., will be made to the boiler room and a Hoppes water-weighing machine will be installed. Boiler equipment,

THE ⌐ SHAPE TUBES EXPLAIN THE SUCCESS

of the

PATTERSON HOT WATER TANK

for heating water for domestic or manufacturing purposes. Both ends of each seamless brass tube are expanded into heavy cast-iron tube-heads with an improved roller expander. Their shape provides for the free contraction and expansion of each individual tube without straining, so there is no danger of leakage.



Type C. Patented Aug. 26, 1913.

Any Combination of Storage and Heating Capacities can be Furnished. Send for Catalogue.

FRANK PATTERSON & CO., 26 Cortlandt Street, New York

Representatives in all Principal Cities.

℞
Good for any building
One Sturtevant
Stationary Vacuum Cleaner
at the time Building is
being Constructed—
or anytime thereafter.

For Home or Large Building

Sturtevant Stationary Vacuum Cleaners are made in 12 sizes and are suitable for any building—whether it be bungalow, skyscraper, school, hospital, hotel or home—Plants made for one or more sweepers to be operated simultaneously.

Sturtevant
(REG. U. S. PAT. OFF.)

Stationary Vacuum Cleaner

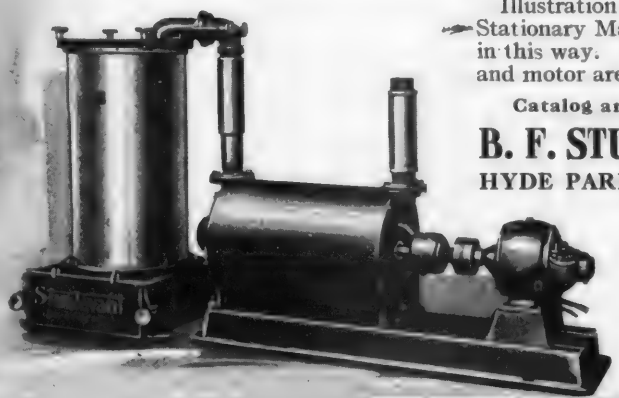


Illustration shows a Sturtevant Horizontal Stationary Machine and the large sizes are made in this way. In the small sizes the suction fans and motor are located on top of dust chamber.

Catalog and full information on request.

B. F. STURTEVANT COMPANY
HYDE PARK, BOSTON, Massachusetts

And All Principal Cities of the World

Air Washers, Fans, Heaters, Motors

which will add approximately 2,000 h.p. to the capacity of the 12,000 h.p. now available, will be put in. This equipment will be furnished by the Conley Boiler Co., Cleveland.

Sheldon, Ia.—The Iowa Light, Heat & Power Company has purchased the Sheldon plant of the Northern Iowa Gas & Electric Co. The new purchasers already have the plants at Rock Valley, Sioux Center, Alton, Orange City, Marcus, Remsen and Kingsley.

Hibbing, Minn.—The Tyler Underground Heating System has been awarded the contract for furnishing steam meters for the new central heating plant in that place, the award being made by the water and light board.

Bellefonte, Pa.—A public hearing was held in Bellefonte recently by Chairman William D. Ainey, of the Public Service Commission, on the complaint of Bellefonte citizens that the Bellefonte Steam Heating Company was not giving adequate service. Chairman Ainey stated that in spite of the shortage of coal it was up to the company to furnish sufficient heat. The company was directed to file a statement of how it proposed to satisfy its patrons.

Spencer, Ia.—The *Spencer Republican* reports an agitation in Spencer to have the council establish a municipal heating plant and heat the business section of the city from such a plant.

New Ulm, Minn.—The approximate cost of the new central heating plant to date is given as $25,000, bringing the total municipal improvements of the past year to $40,451. The cost of the central heating plant is placed under municipal improvements, as it will eventually become a municipal property. So far the city has not made any actual outlay as the expense was borne for the time being by the business men of the city who will profit by its use. When the city furnishes sufficient steam to total an amount equal to the cost of the plant, it will be given a clear title to the property. The greater number of business houses within a two-block area are using the heating service.

Rochester, N. Y.—Edward L. Wilder, assistant manager of the Rochester Railway & Light Co., industrial department, was the principal speaker at a recent meeting of the Rochester Engineering Society, his subject being district heating in connection with central power stations. He stated that the surprising thing about district heating is that there should be comparatively so few of such systems, and he predicted a wide growth of this industry.

Public buildings throughout the country depend upon

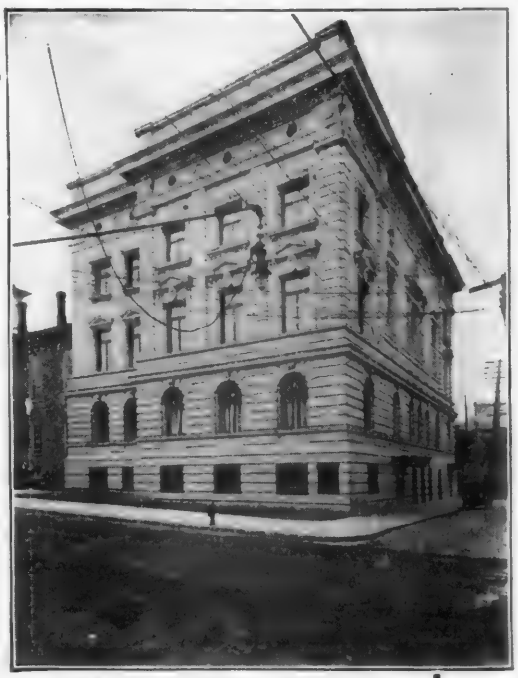
Westinghouse Motors

to drive the ventilating equipment.

Ventilation of any public building where large audiences congregate require the moving of a large volume of air without noise.

The quiet and reliable operation of these motors has led many engineers and architects to select them to drive the ventilating equipment in many of the leading public buildings.

Our engineers will be glad to assist in drawing the plans for your next job.



Lehigh County Court House, Allentown, Pa.

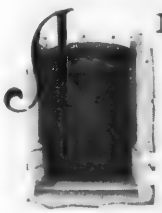
Westinghouse Electric & Mfg. Co.

Sales Offices in all Large American Cities **East Pittsburgh, Pa.**

The New "Siroccofied" Building of the Detroit Trust Company

Albert Kahn, Architect
Ernest Wilby, Associate
Detroit

E. E. Harris,
Engineer
Detroit



A MILLION DOLLAR INSTITUTION with a directorate and personnel which not only can have, but demands, the finest, most efficient housing.

A really remarkable building for an institution which is great even among our great American institutions of finance.

The very selection of the appliances and equipment of such captains as these tells a far greater story of merit than could be told in words of any kind. And by reason of the same facts, these things must be the safest of guides in purchasing and specifying.

AMERICAN BLOWER COMPANY

DETROIT, MICHIGAN

BRANCHES EVERYWHERE

Alva O. Greist, formerly vice-president and chief engineer of the Burling Engineering & Construction Co., New York, which acted as engineers and contractors for all of the recent construction work of the New York Steam Company, New York, announces that he has opened a consulting engineering business in which he will specialize in the making of valuation and observation reports and physical audits covering operating property, with especial reference to central station heating plants, both station connections and underground distributing systems. He will also act as designing engineer on new projects, with special reference to boiler plant practice, prime movers and auxiliaries and their proper assembling, together with the structures necessary to properly house them. His address is 68 Bruce Ave., Yonkers, N. Y. During his connection with the Burling Engineering & Construction Company, Mr. Greist supervised the entire rebuilding of the New York Steam Company's underground system, also the rebuilding of one 10,000 h.p. power station and the designing and building of a new one of 12,000 h.p. Both of these stations are designed to operate at 200% of their ratings continuously. Previous to this work, Mr. Greist was connected with the American Public Utilities Co., Grand Rapids, Mich., on power station work, going to that company from W. H. Schott of Chicago, with whom he was connected for twelve years.

Manufacturers' Notes.

Thompson Heating Co., Columbus, O., has placed in operation its new furnace manufacturing plant at Mound and Canal Streets.

Moline Heating & Construction Co., Moline, Ill., is now well settled in its new quarters on Third Avenue in the building erected for the company's use. It is 2½ stories high, of brick, 96 x 28 ft. The company manufactures the well-known "Moline Heat" system and, it is stated, has from 8,000 to 9,000 installations in the United States and Canada.

Holland Furnace Co., Holland, Mich., whose capital stock was recently increased from $150,000 to $300,000, will establish a factory in Cedar Rapids, Ia., on land near the Pawnee or National Oats mills. From 75 to 100 men will be employed at first. It is announced that the company's output of warm air furnaces will be increased from fifty to eighty-six a day.

Kellogg-Mackay Co., Chicago, Ill., dealers in heating and plumbing supplies, were

Sturtevant Autoforce Ventilators

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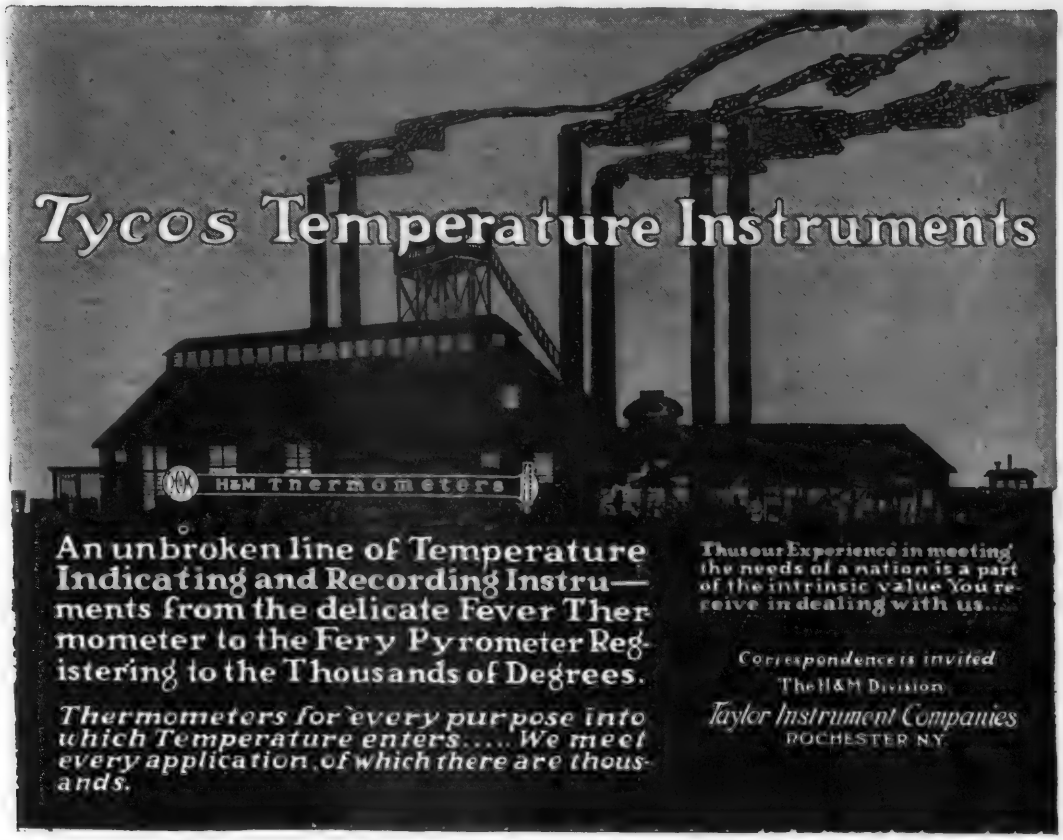
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among the firms which gave their employees Christmas bonuses. The 100 employees of the company received 10% of their yearly salary as a bonus.

Scientific Heater Co., Cleveland, O., manufacturer of the Scientifis gas heater, which is being used extensively for garage heating, is contemplating building a new plant. The company at present occupies 20,000 sq. ft. of floor space, and employs 150 people.

Kennedy Valve Mfg. Co., Elmira, N. Y., held a convention of its sales force December 14 and 15. At the conclusion of the convention the party were entertained at dinner at the Country Club in Elmira. The meetings were under the direction of J. L. Peden, the company's new sales manager.

Ohio Blower Co., Cleveland, O., will build a new plant on a site recently purchased on Detroit Avenue, near West 91st Street. The first unit will be a four-story building, 60 x 200 ft. The Osborn Engineering Company drew the plans. The company also announces the opening of a New York office at 132 Nassau Street.

Kewanee Boiler Co., Kewanee, Ill., has made application to increase its capital stock from $1,500,000 to $2,000,000.

Goulds Mfg. Co., Seneca Falls, N. Y., gave its salaried employees an extra month's salary at Christmas. This followed an increase of 10%, in November last, in the wages to all piece workers, as well as hour and day men.

H. W. Johns-Manville Co., New York, announces the opening of a new branch office in Des Moines, Ia. This brings the number of the company's branches up to fifty-five, and it is stated that practically every important city in North America now has a Johns-Manville branch. William B. Roberts, who has been with the company a number of years, taking care of the Iowa sales, has been appointed manager of the new office and will have under him a corps of salesmen and construction men to handle the Johns-Manville products throughout the Des Moines section.

Pierce, Butler & Pierce Mfg. Corporation, New York, held a convention of all of its eastern salesmen at the company's plant in Eastwood, N. Y., near Syracuse, January 19 and 20. Two entire days were given up to sessions on business matters connected with the sale of the company's products. Demonstrations were given of the latest manufacturing methods and instruction given in the sales policies of the company for the coming season. The salesmen were all accommodated at the Onondaga but the meals were served at the

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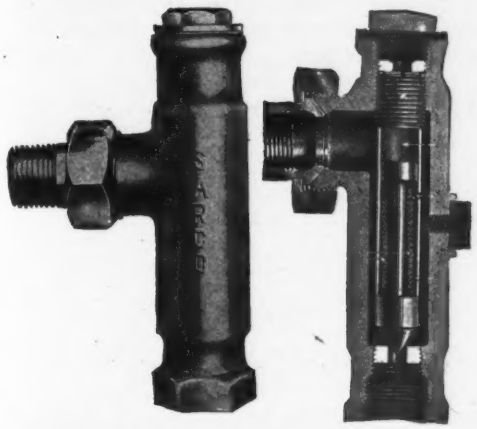

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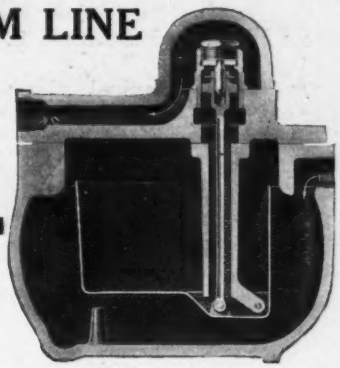

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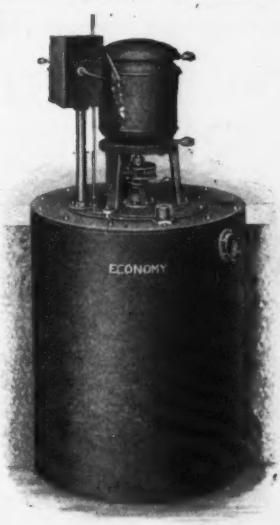

Figure 2175

Economy Pumping Machinery Co.

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plant in Eastwood from the recently-equipped kitchen installed for the service of the employees.

New Firms and Business Changes.

Minnesota Mechanical Equipment Co., St. Cloud, Minn., has been organized, with C. J. Cummings as president. Mr. Cummings was previously connected with the Healy Plumbing & Heating Co., and spent five years at Glacier Park where he supervised the heating and plumbing installations in a chain of hotels.

New Incorporations.

Roth Wind Power Ventilator & Fan Co., New York, capital $50,000, to deal in ventilators, fans, etc. Incorporators: A. Roth, 35 St. Nicholas Ave., New York; E. I. Rudd, Glenbrook, Conn., and H. E. Walker, 18 East 41st Street, New York.

Cullen Vapor Heating Co., Jersey City, N J., capital $50,000 to deal in heating and plumbing supplies. Incorporators: Thomas J. Cullen, James F. McMullen, and M. E. McCormack, all of Jersey City.

Thompson Heater Corporation, Buffalo, N. Y., capital $150,000, to manufacture heating boilers, radiators, etc. Incorporators: F. A. Abbott, H. M. Jack and R. E. Powers, all of Buffalo

Jas. L. Wilson & Sons, Buffalo, N. Y., capital $50,000, to conduct a general heating and plumbing contracting business. Incorporators: J. L. C. Wilson, L. L. Wilson, 284 Grant St., Buffalo; and R. P. Wilson, 57 Euclid Ave., Kenmore.

E. P. Bates Co., Syracuse, N. Y., capital $100,000, to take over the heating and ventilating engineering and contracting business of Edward P. Bates, 228 West Water Street. Officers: President, Edward P. Bates; vice-president, Frank Boggs; treasurer, D. Cady Fulmer; secretary, Albert J. Strauss.

Albert C. Smith & Co., Poughkeepsie, N. Y., capital $10,000, to conduct heating and plumbing contracting business. Incorporators: I. Shaker, A. D. Berneel, and A. C. Smith, 60 Grand St., New York.

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